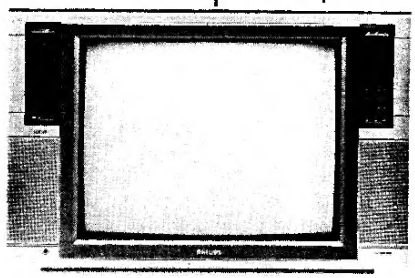
Colour television

21CE4550/02S/05S/10S/10Z/13S

Service
Service
Service

21CE4551/10Z

21CE5554/05R,

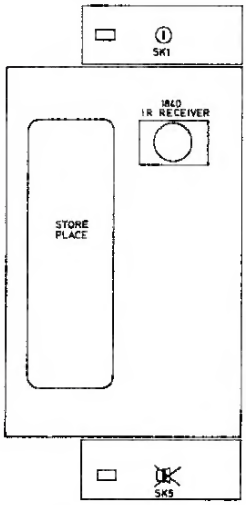


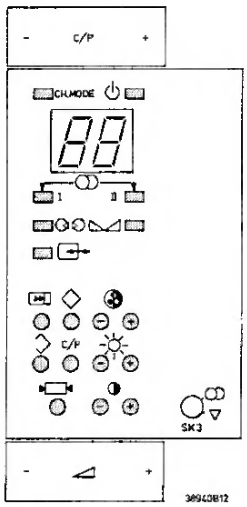
39 598 A12

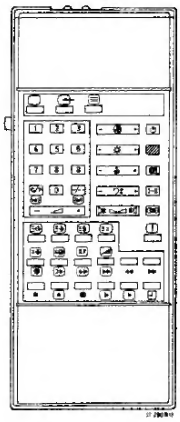
Service Manual

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

CHASSIS 2B







RC 5336

220-240 V~ (± 10%)
105 W

75 Ω coax.

A51EAL00X03

2x10 W

8-1000 Ω

IN/OUT

0-2 Vrms/≥ 10 kΩ

a × b × c
671 × 430 × 471 mm

	FE618Q	FE644Q
VHFa :	46-110 MHz	–
VHFb :	111-300 MHz	–
UHF :	470-860 MHz	470-860 MHz

Documentation Technique Service Dokumentation Documentazione di Servizio Huolte-Ohje Manual de Servicio Manual de Serviço
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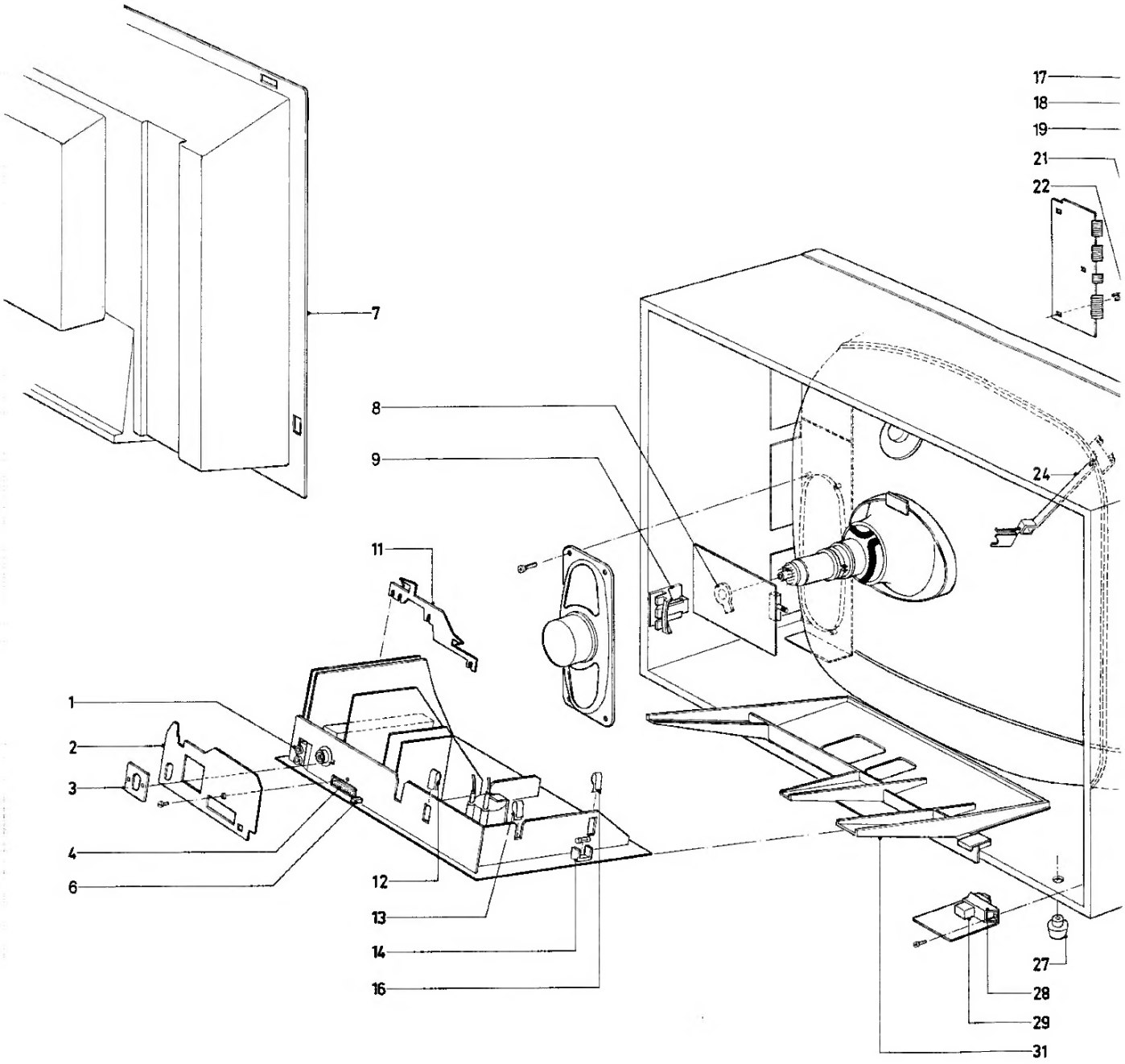

1	4822 267 30631	Cinch socket
2	4822 466 91677	Plastic plate
3	4822 432 91895	Plastic plate
4	4822 267 60172	SCART socket
6	4822 410 24151	Knob
7	4822 438 20171	Rear cover
8	4822 255 70216	Socket, picture tube
9	4822 404 30415	Block fix. rear cover
11	4822 404 30803	Bracket fix. modules
12	4822 492 41268	Spring
13	4822 492 63339	Spring
14	4822 256 30274	Fuse holder
16	4822 492 62907	Spring
17	4822 255 40524	LED holder 4 fold
18	4822 255 40526	LED holder 1 fold

19	4822 27
21	4822 27
22	4822 4(
24	4822 4(
27	4822 46
28	4822 4(
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37	4822 27
37	4822 27

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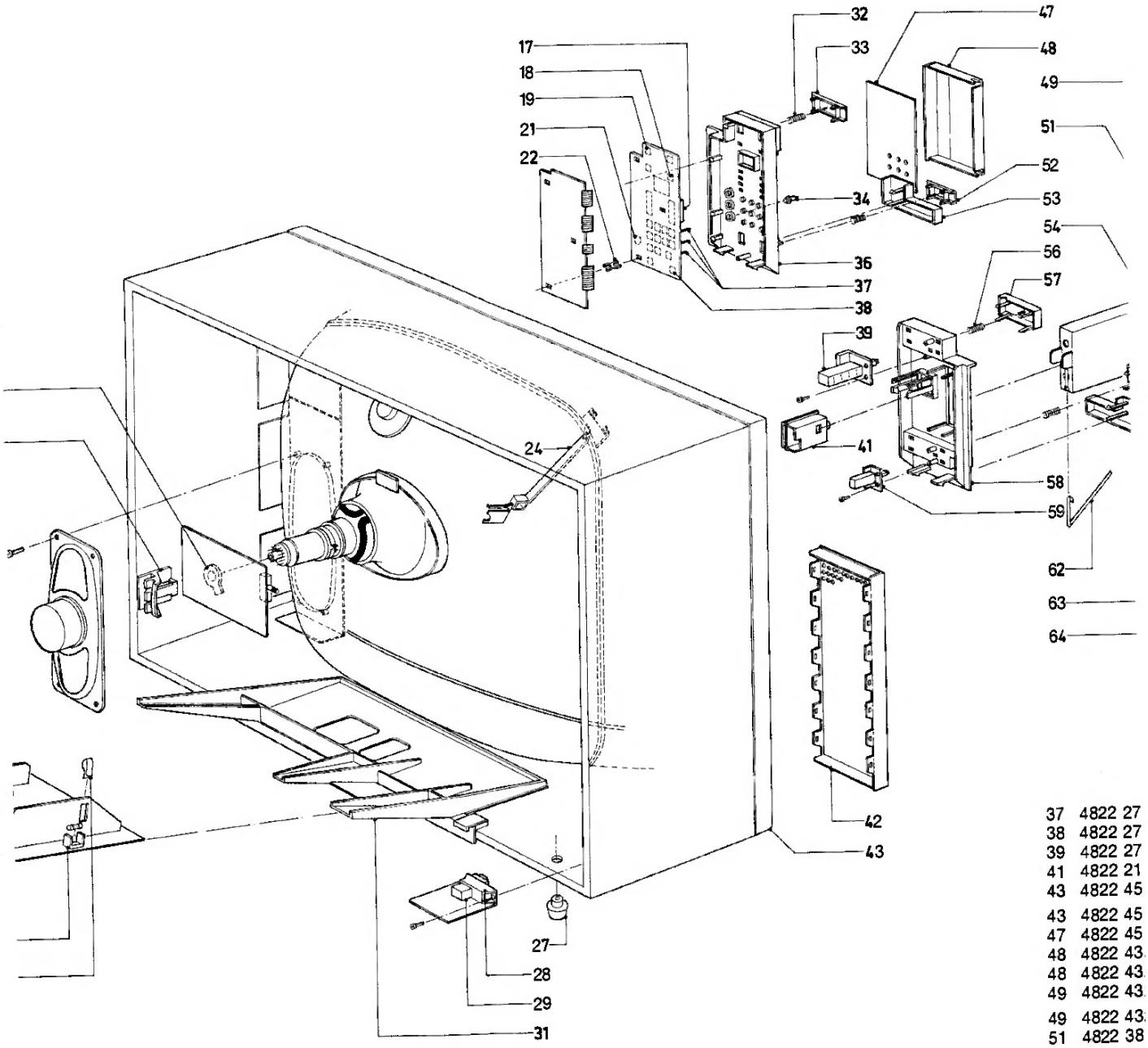

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11	4822 404 30803	Bracket fix. modules
12	4822 492 41268	Spring
13	4822 492 63339	Spring
14	4822 256 30274	Fuse holder
16	4822 492 62907	Spring
17	4822 255 40524	LED holder 4 fold
18	4822 255 40526	LED holder 1 fold

19	4822 276 11724	Switch C/P
21	4822 273 40305	Switch SK3
22	4822 401 10751	Spacer
24	4822 404 30718	Clamp
27	4822 462 40932	Foot
28	4822 404 30643	Bracket
29	4822 267 30324	Socket, headphone
31	4822 464 70397	Frame fix. carrier
32	4822 492 51632	Spring
33	4822 411 50559	Knob C/P
34	4822 413 31375	Knob stereo-mono
36	4822 459 61075	Front
37	4822 276 11721	Switch C/P (blue)
37	4822 276 11719	Switch PP (green)
37	4822 276 11722	Switch store (red)

37	4822 27
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39	4822 27
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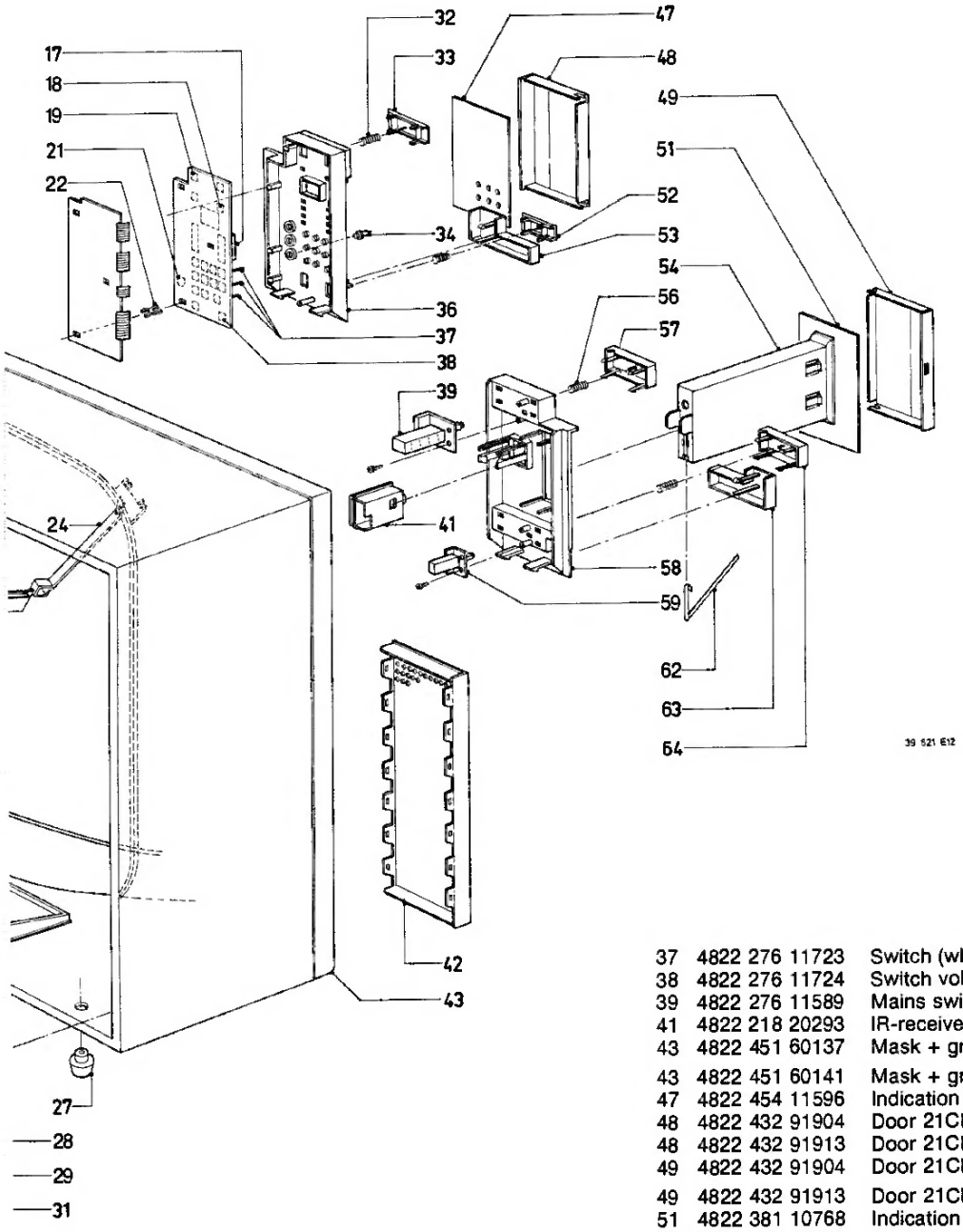

19	4822 276 11724	Switch C/P
21	4822 273 40305	Switch SK3
22	4822 401 10751	Spacer
24	4822 404 30718	Clamp
27	4822 462 40932	Foot
28	4822 404 30643	Bracket
29	4822 267 30324	Socket, headphone
31	4822 464 70397	Frame fix. carrier
32	4822 492 51632	Spring
33	4822 411 50559	Knob C/P
34	4822 413 31375	Knob stereo-mono
36	4822 459 61075	Front
37	4822 276 11721	Switch C/P (blue)
37	4822 276 11719	Switch PP (green)
37	4822 276 11722	Switch store (red)
37	4822 276 11723	Switch (white)
38	4822 276 11724	Switch volume
39	4822 276 11589	Mains switch
41	4822 218 20293	IR-receiver
43	4822 451 60137	Mask + grille 21CE4550
43	4822 451 60141	Mask + grille 21CE4551
47	4822 454 11596	Indication plate
48	4822 432 91904	Door 21CE4550
48	4822 432 91913	Door 21CE4551
49	4822 432 91904	Door 21CE4550
49	4822 432 91913	Door 21CE4551
51	4822 381 10768	Indication plate
52	4822 411 50561	Knob volume
53	4822 432 91906	Cover plate 21CE4550
53	4822 432 91914	Cover plate 21CE4551
54	4822 432 30267	Store box remote control
56	4822 492 41585	Spring
57	4822 410 24878	Knob on/off
58	4822 459 61074	Front
59	4822 276 11226	Switch mute
62	4822 492 63176	Leaf spring
63	4822 432 91896	Cover plate 21CE4550
63	4822 432 91912	Cover plate 21CE4551
64	4822 410 24803	Knob mute
	4813 462 17327	Stand end
	4813 462 37078	Cross rail
	4813 528 77119	Castors
	4813 462 17328	VCR bracket

only for /05 version

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1015	4822 210 40317	Front-end FE644Q (tuner + i.f.) for /05 version	
1015	4822 212 22455	Front-end FE618Q (tuner + i.f.) for other versions	
1100	4822 212 22351	Stereo decoder for /05 version	
1100	4822 212 22349	Stereo decoder for other versions	
1250	4822 212 22344	Headphone panel	
1300	4822 212 22348	PAL decoder for other versions	
1300	4822 212 22352	PAL/SECAM decoder for /02 version	
1400	4822 212 22347	Picture tube panel	
1750	4822 212 22345	TXT decoder for /02/10 versions	For sets with AG02 code
1750	4822 212 22346	TXT decoder for /05 version	
1750	4822 212 22396	TXT decoder for /13 version	
1750	4822 212 22436	TXT decoder for /02/10 versions	For sets with AG03 code and higher
1750	4822 212 22437	TXT decoder for /05 version	
1750	4822 212 22438	TXT decoder for /13 version	
1830	4822 212 22343	Keyboard panel for /05 version	
1830	4822 212 22342	Keyboard panel for other versions	
1840	4822 218 20293	IR receiver	
1850	4822 218 20431	IR transmitter RC5336	
5991	4822 157 52474	Degaussing coil	
5996	4822 240 40167	Loudspeaker AD36902/X15A	
5998	4822 240 40167	Loudspeaker AD36902/X15A	

21CE4550/02S	→ PAL B/G/H + SECAM B/G/H +	TXT
21CE4550/05S	→ PAL I	TXT
21CE4550/10S/10Z/13S	→ PAL B/G/H	TXT
21CE4551/10Z	→ PAL B/G/H	TXT

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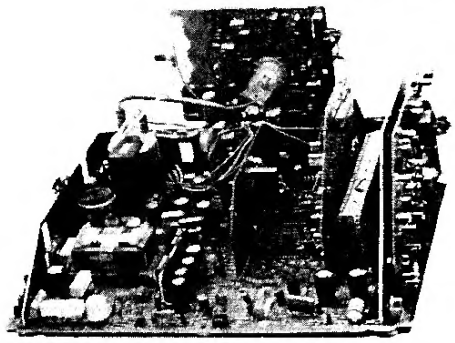
Service
Service

Version 2



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Service Manual

TECHNICAL DATA

Mains voltage	: 220-240 V ~ (± 10%)
Aerial input impedance	: 75 Ω - coax
Minimum aerial input VHF	: 30 µV
Minimum aerial input UHF	: 40 µV
Maximum aerial input	: 180 mV
Pull-in range colour sync	: +300 Hz/–300 Hz
Pull-in range horizontal sync	: +600 Hz/–600 Hz
Pull-in range vertical sync	: +5 Hz/–5 Hz
Picture tube range	: 24/27 inch 110° flat-square
	: 21 inch 90° flat square

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2.

WARNINGS

1. Safety regulations demand that the set be restored to its original condition and that components identical to the original types be used.
   Safety components are marked by the symbol ⚠.
2. In order to preclude damage to IC's and transistors flashover of the EHT should be avoided.
   For checking the EHT, use a suitable measuring instrument.
   The picture tube should only be discharged in the manner shown in Fig. 1.

3. ESD

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD)
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

4. A set to be repaired should always be connected to the mains via a suitable isolating transformer.
5. Proceed with care when testing the EHT section end the picture tube.
6. Never replace any modules or other parts while the set is switched on.
7. Wear safety goggles during replacement of the picture tube.
8. Use plastic instead of metal alignment tools.
   This is in order to preclude short-circuits or to prevent a specific circuit from being rendered unstable.

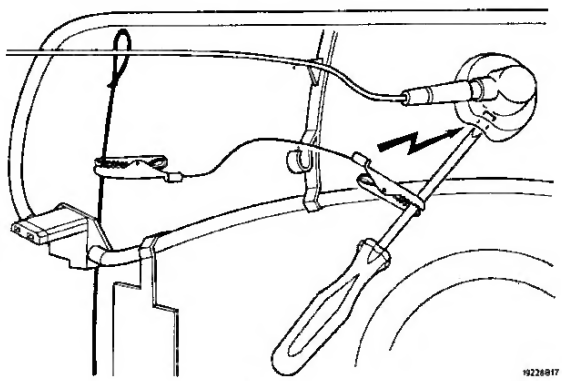

Fig. 1

REMARKS

1. The direct voltages and waveforms should be measured relative to the nearest earthing point on the p.c. board.
2. The direct voltages should be measured as follows:
   Apply an aerial signal and adjust receiver for minimum brightness, maximum saturation and contrast.
3. The waveforms should be measured under the following conditions:
   a. Use a colour-bar pattern as input signal.
   b. Connect an oscilloscope (0,1 V/div.-DC) to point 5 of TDA4580 (item 7300) via an 10:1 attenuator probe.
   c. Set the saturation control to obtain 3 V d.c. on point 16 of TDA4580 (item 7300).
   d. Set the brightness control so that the level of the black bar in the video signal is situated at 3 V (see Fig. 2).
   e. Set the contrast control for a video signal amplitude of 2,8 V.

4. The CRT board is provided with printed sperk gaps.
   Each spark gap is arranged between an electrode of the CRT and the aquadag coating.
5. During manufacture alternative semi-conductors may be used.
   However the semi-conductors specified in the parts list and circuit diagram can always be used as replacements.
6. Connectors used for the modules (board to board) have been gold-plated and must be replaced by the same type only.

Fig. 2

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MECHANICAL INSTRUCTIONS

1. To facilitate troubleshooting end/or repairing the set can be placed on a side and then the chassis can be pulled backwards as far as possible.
2. After prizing up the clamping rings K with a screwdriver or side-cutting pliers the EHT and focus cable may be pulled off the line output transformer (see Fig. 3a).
   When refitting the cable first press the clamping ring onto the transformer until a click is heard; after this the cable may be pressed in place.
   Make sure that the cable is pressed down well.
3. The focus potentiometer is not soldered in place and may be removed after the fixing lugs A have been released (see fig. 3b).
   The focus cables can be removed after removal of the ceramic plate B.
   Now the focus cables can simply be inserted into the new focus potentiometer until a click is heard.
   At the side of the picture tube base the focus cable can be pulled loose with strong force.
   Relief the tube base by holding it with the thumb.

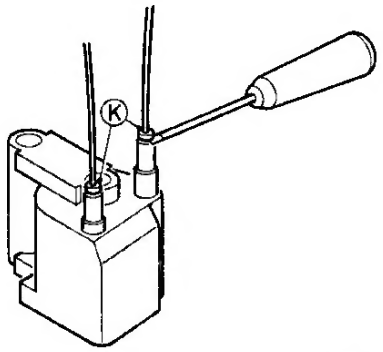

Fig. 3a

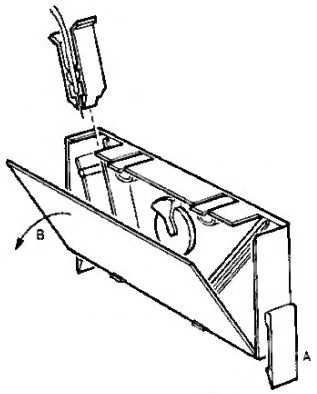

Fig. 3b

ELECTRICAL ADJUSTMENTS

A. ADJUSTMENTS TO THE MAIN PANEL (Fig. 4)

1. +140 V power supply voltege.

Connect e voltmeter (DC) between pin 5 of connector M17 and ground.
Adjust 3715 for a voltage of 140 V.

2. Horizontal synchronisation

Apply an aerial signal.
Connect a 4k7 resistor between point 2 and point 22 of IC7550.
Adjust 5555 until the picture is stationary.
Remove the resistor.

3. Horizontal centring

This is adjusted with 3542.

4. Picture width

The picture width is adjustable with 3595.

5. Vertical centring

This is adjusted with SK4.

6. Picture height

The picture height is adjustable with 3559.

B. ADJUSTMENTS TO THE CRT BOARD (Fig. 5)

1. Focussing

This is adjusted with 1474.

2. Cut-off point of CRT

Apply an aerial signal. Adjust contrast, brightness and saturation for minimum. Measure with an oscilloscope (frame-frequent) to the points 6, 8 and 11 of the picture tube.
Note at which level the lower side of each oscillogram lies (see Fig. 3c). Now connect the oscilloscope to the point where the highest level was noted. Adjust 3472 so, that this level becomes 140 V (see Fig. 3c).

3. Grey scale

Apply a grey scale test-pattern signal and set the controls to their normal settings.
Allow the set to warm up for about 10 minutes.
Adjust 3414 and 3434 until the desired grey-scale is obtained.

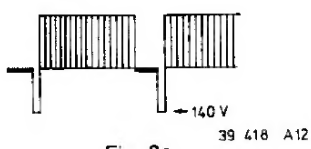

Fig. 3c

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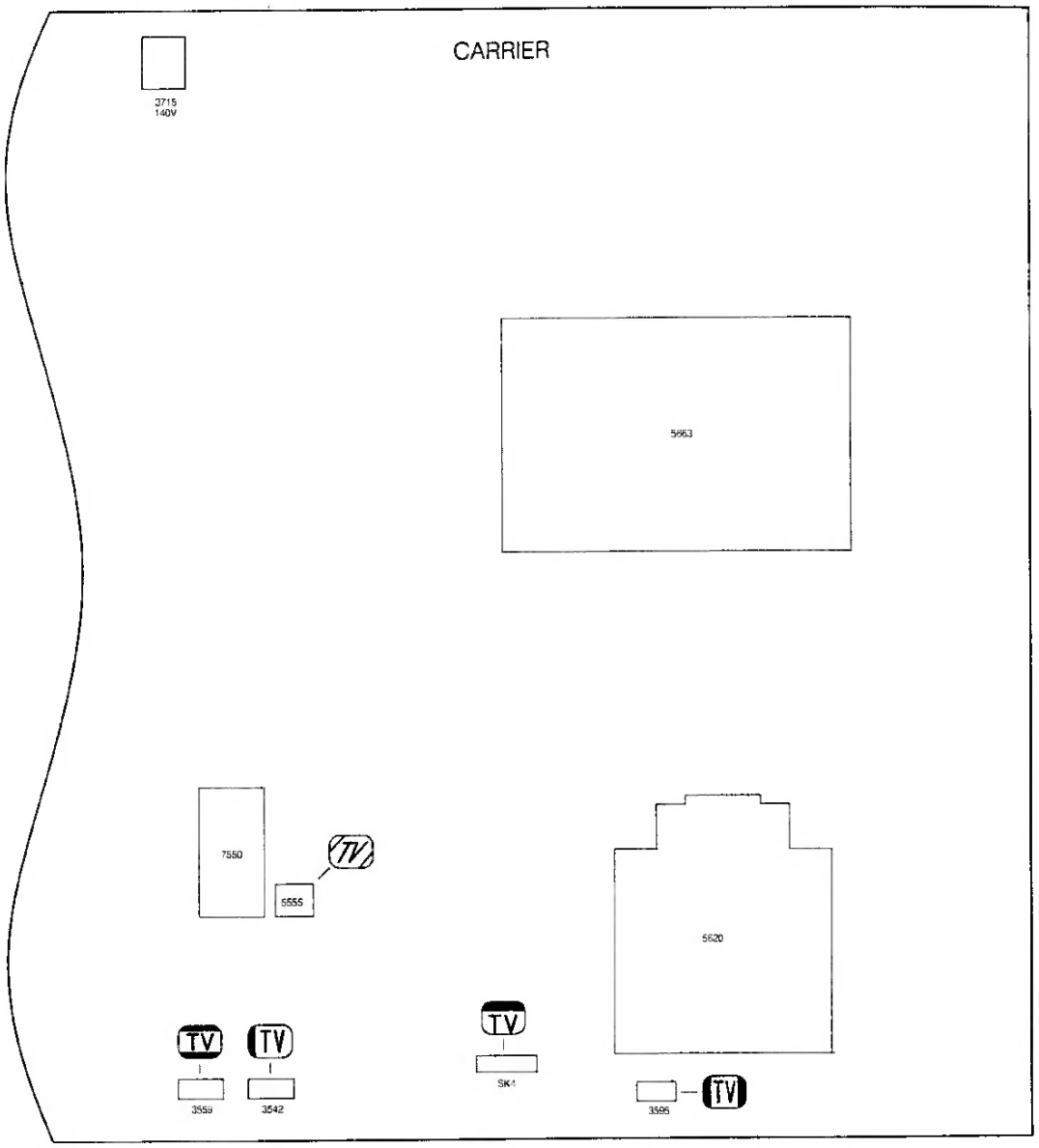

Fig. 4

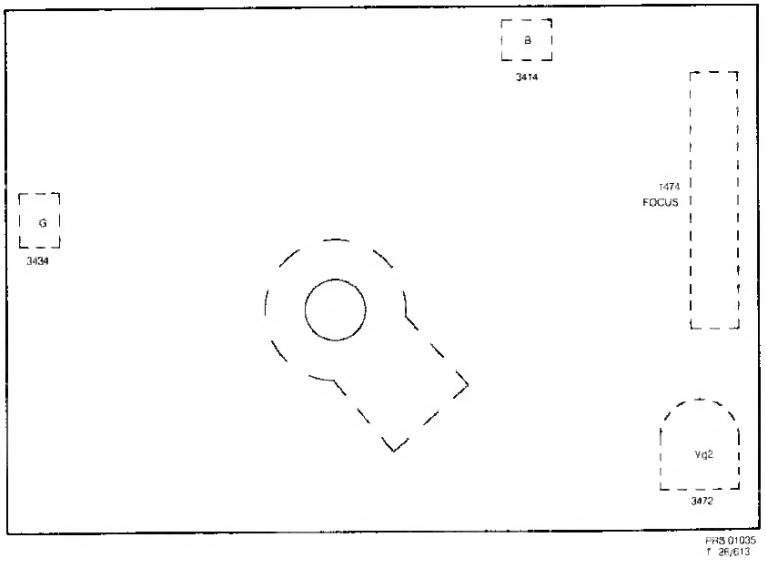

Fig. 5

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4.

CHROMINANCE

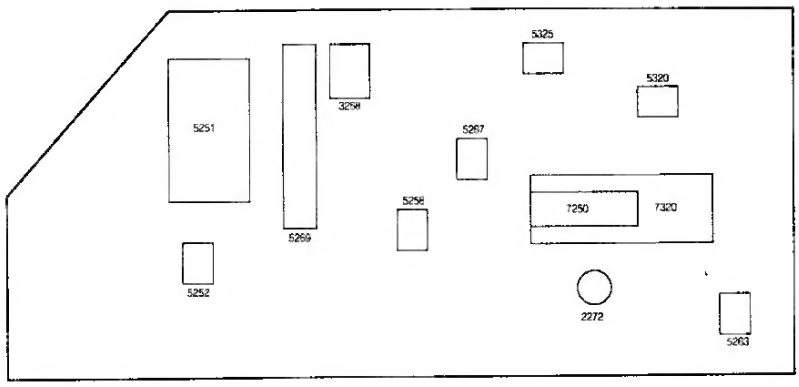

Fig. 6

STEREO DECODER

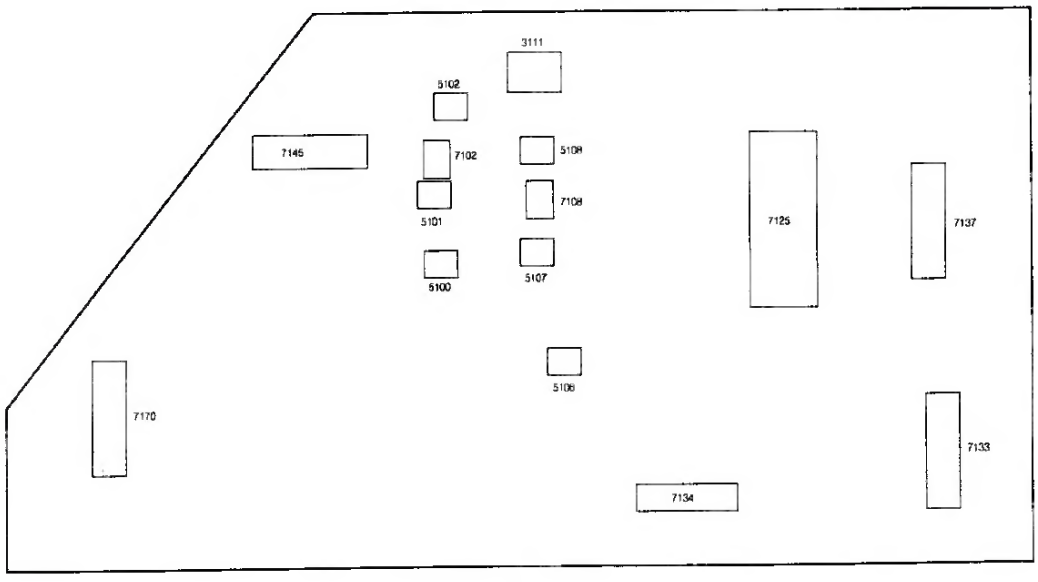

Fig. 7

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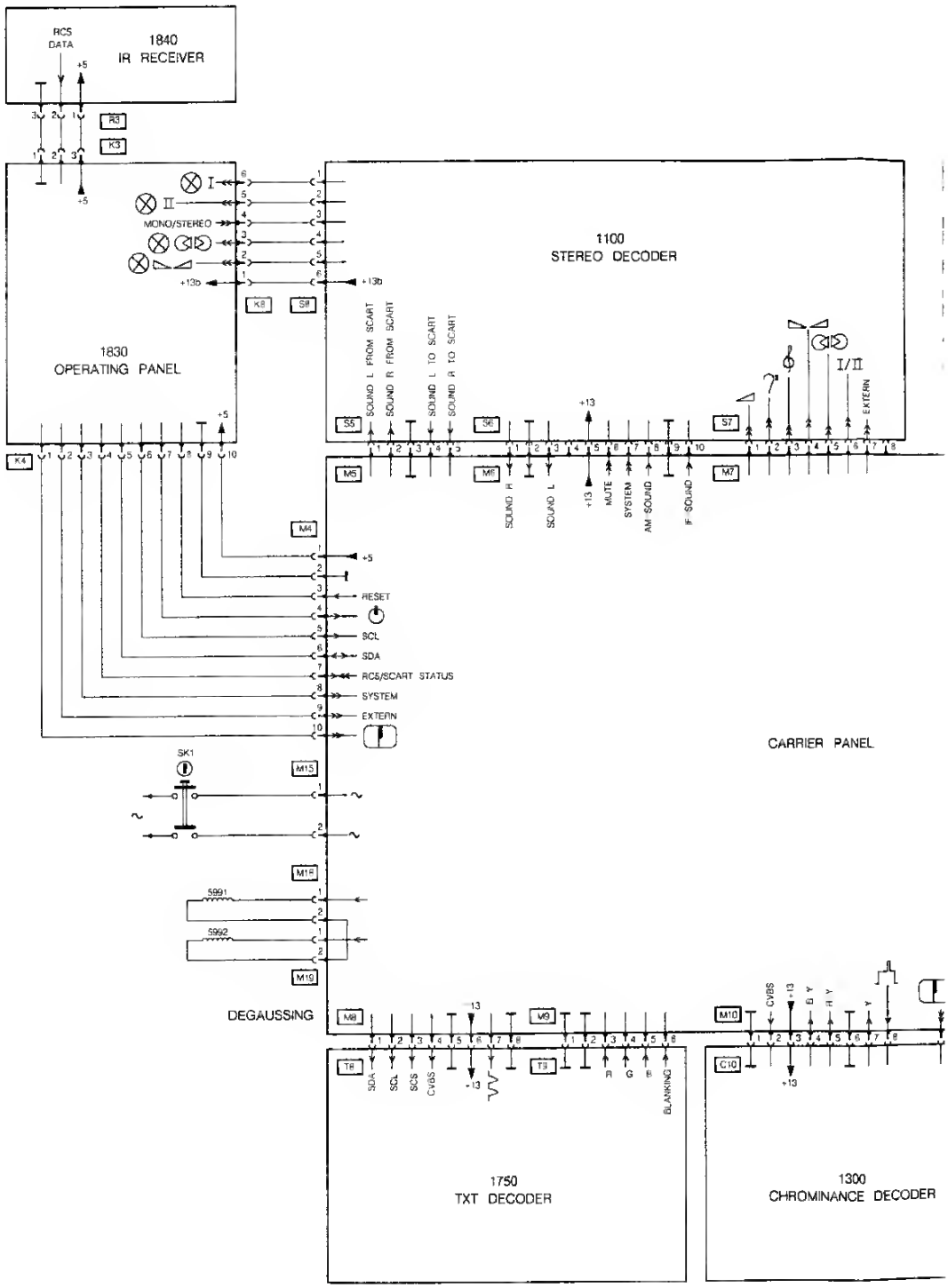

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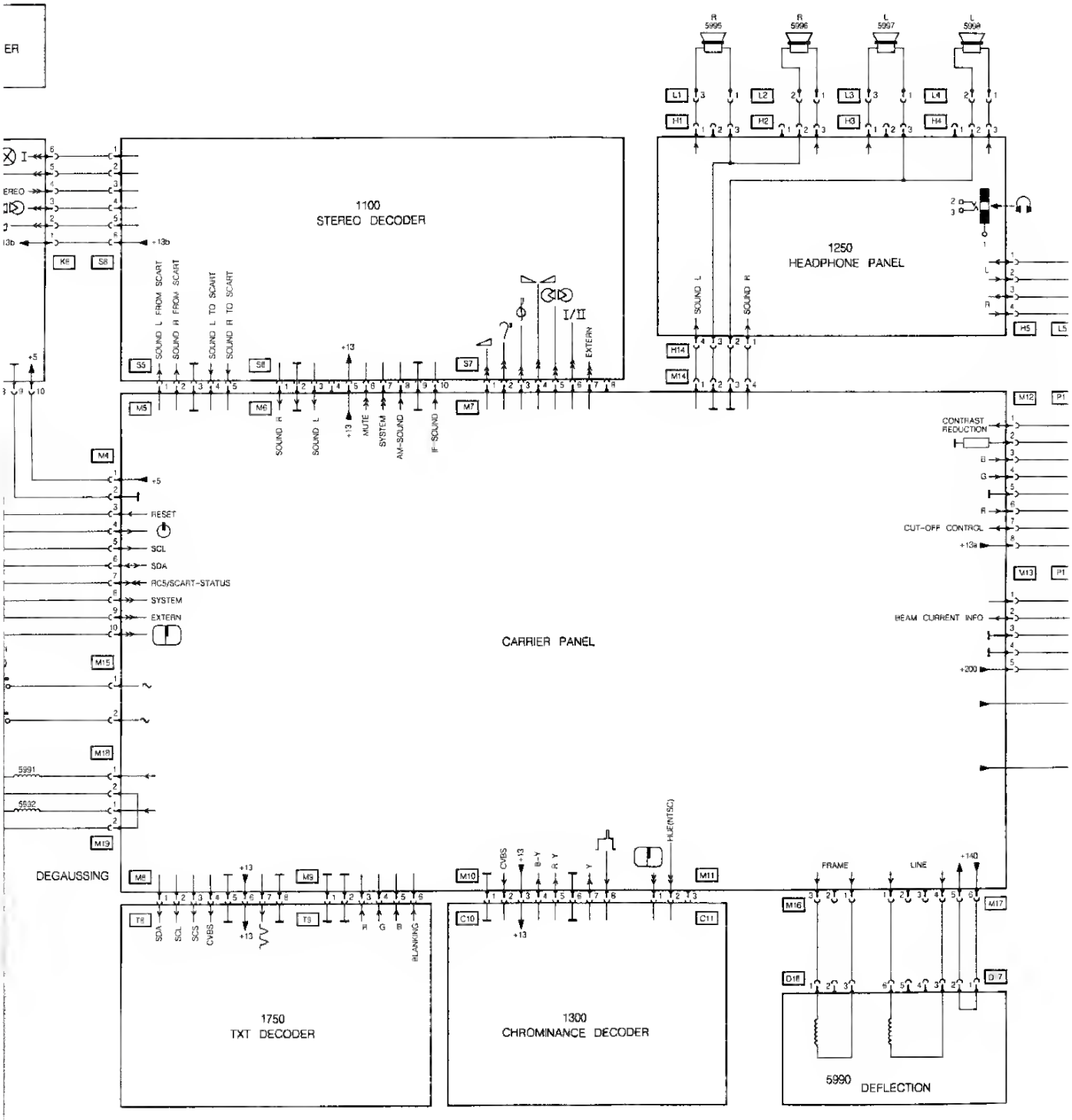

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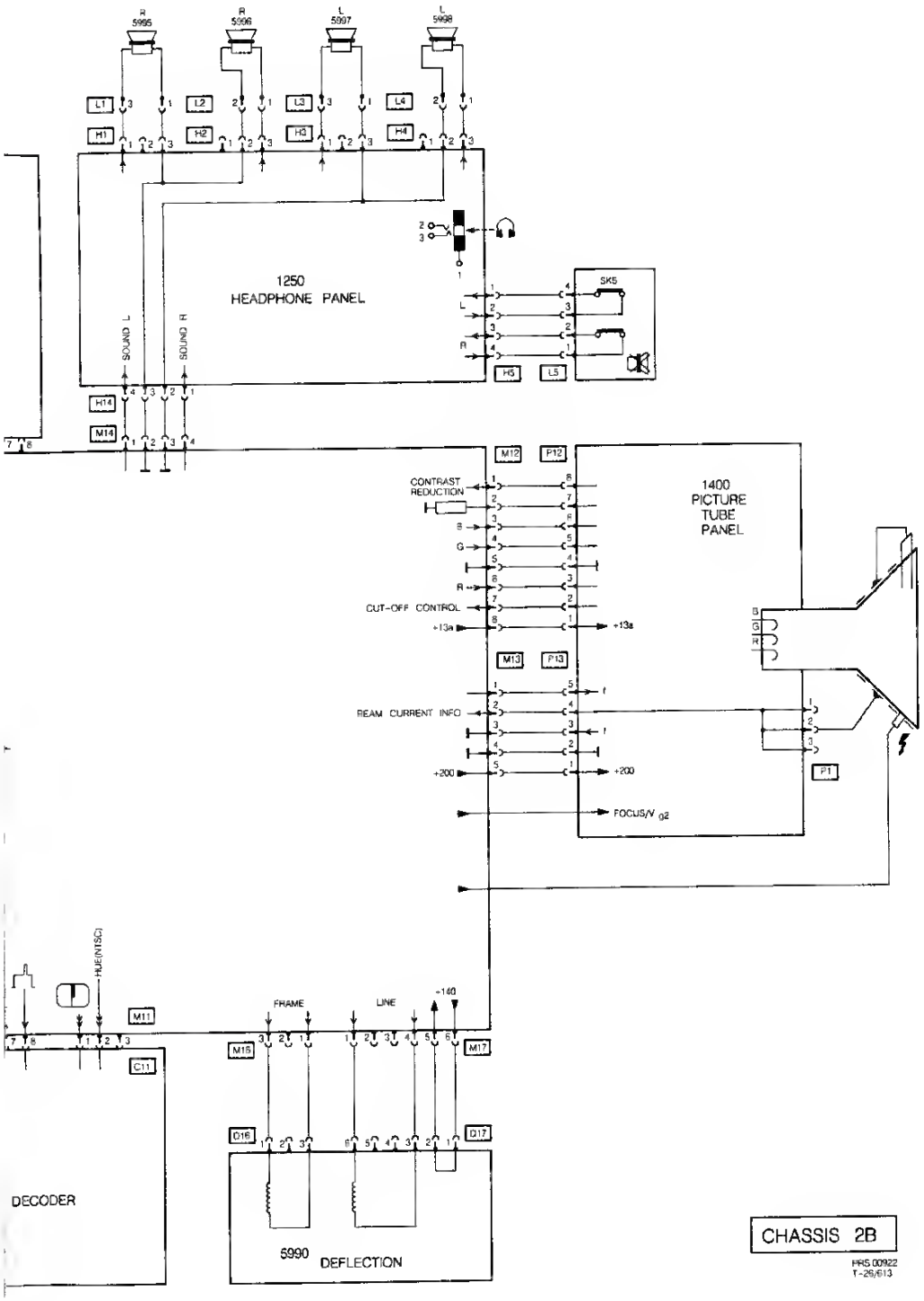

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PICTURE TUBE PANEL 1400

BC548C	4822 130 44196			
BC558B	4822 130 44197			
BF423	4822 130 41646			
BF485	4822 130 42702			
BF583	4822 130 60143			
BF870	4822 130 60126			
1N4148	4822 130 31438			
3400	4822 111 30539	150	Ω	0,33 W
3401	4822 111 30582	6.2	kΩ	0,33 W
3402	4822 111 30568	2	kΩ	0,33 W
3402	4822 111 30561	1	kΩ	0,33 W
3414	4822 100 20148	1	kΩ	potm.
3419	4822 116 52408	2.2	kΩ	0,5 W
3421	4822 111 30582	6.2	kΩ	0,33 W
3422	4822 111 30568	2	kΩ	0,33 W
3422	4822 111 30561	1	kΩ	0,33 W
3434	4822 100 20148	1	kΩ	potm
3439	4822 116 52408	2.2	kΩ	0,5 W
3441	4822 111 30582	6.2	kΩ	0,33 W
3442	4822 111 30568	2	kΩ	0,33 W
3442	4822 111 30561	1	kΩ	0,33 W
3459	4822 116 52408	2.2	kΩ	0,5 W
3470	4822 116 52408	2.2	kΩ	0,5 W
3471	4822 116 52413	2.7	kΩ	0,5 W
3472	4822 101 10127	4.7	MΩ	potm
3473	5322 116 52489	1.3	MΩ	0,25 W
3491	4822 116 53105	3.3	kΩ	0,6 W
3492	4822 116 52776	2.2	kΩ	0,4 W
2466	4822 122 31695	1	nF	2000 V

(board)

P12	4822 265 40422	8p
P13	4822 265 30351	5p
P1	4822 265 30407	3p

(cable)

P12	4822 265 40253	8p
P13	4822 265 30275	5p
P1	4822 265 30273	3p

Various

1474	4822 101 20814	Focus pot. meter
	4822 255 70216	Socket picture tube

AUXILIARY PANEL NEAR SYNC. IC

BC557	4822 130 44256			
BC558	4822 130 40941			
BZX55-C33	4822 130 33684			
BZX79-C12	4822 130 34197			
1N4148	4822 130 31438			
3548	4822 110 72203	3.9	MΩ	0,25 W
3549	4822 110 72214	10	MΩ	0,25 W
3550	4822 110 72189	1.2	MΩ	0,25 W

HEADPHONE PANEL 1250

2244	4822 124 21941	2.2 µF	63 V
2245	4822 124 21941	2.2 µF	63 V

(board)

H1÷H4	4822 265 30407	3p
H5	4822 265 30378	4p
H14	4822 265 30378	4p

(cable)

H1÷H4	4822 265 30273	3p
H5	4822 265 40507	4p
H14	4822 265 40507	4p

Various

4822 267 30324	Socket,jack
4822 404 30643	Bracket

MAINS FILTER 1950 (ONLY FOR 24 INCH)

2101	4822 121 50627	470 nF	250 V
5101	4822 158 30208		

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CARRIER PANEL

3023	4822 111 30515	18 Ω	0,33 W
3030	4822 111 30505	7.5 Ω	0,33 W
3203	4822 111 30494	2.7 Ω	0,33 W
3213	4822 111 30494	2.7 Ω	0,33 W
3290	4822 111 30508	10 Ω	0,33 W
3535	4822 111 30508	10 Ω	0,33 W
3542	4822 100 20487	10 kΩ	potm.
3557	5322 116 64011	30 MΩ	0,25 W
3558	4822 110 72201	3 3 MΩ	0,25 W
3559	4822 100 11022	1 MΩ	potm.
3560	5322 116 64026	6 2 MΩ	0,25 W
3592	4822 116 52302	750 kΩ	0,5 W
3595	4822 100 20487	10 kΩ	potm.
3602	4822 111 30513	15 Ω	0,33 W
3632	4822 116 53418	2.7 kΩ	5 W
3632	4822 116 53568	3.3 kΩ	5 W
3644	4822 111 30483	1 Ω	0,33 W
3645	4822 111 30483	1 Ω	0,33 W
3646	4822 111 30494	2.7 Ω	0,33 W
3647	4822 111 30494	2.7 Ω	0,33 W
3651	4822 111 30553	470 Ω	0,33 W
3652	4822 111 30553	470 Ω	0,33 W
3653	4822 116 40033	NTC/PTC	(110°)
3653	4822 116 40065	PTC/PTC	(90°)
3654	5322 113 41033	2.2 Ω	7 W
3654	4822 113 80388	3.9 Ω	7 W
3664	4822 113 80383	82 Ω	7 W
3666	4822 111 30502	5.6 Ω	0,33 W
3671	4822 113 11002	15 Ω	5 W
3678	4822 116 52784	2.7 kΩ	0,4 W
3679	4822 116 52776	2.2 kΩ	0,4 W
3683	4822 116 53087	1 2 kΩ	0,4 W
3705	4822 116 53028	7.5 kΩ	0,6 W
3715	4822 100 20488	470 Ω	potm.
3935	4822 111 30498	4 3 Ω	0,33 W

2544	4822 121 42477	47 nF	50 V
2553	4822 121 42477	47 nF	50 V
2554	4822 121 50753	2.2 nF	160 V
2572	4822 121 42477	47 nF	50 V
2608	4822 124 21208	4.7 µF	50 V
2609	4822 121 40249	8.2 nF	1600 V
2609	4822 121 42383	6 2 nF	2000 V
2611	4822 121 40479	390 nF	250 V
2612	4822 121 42597	360 nF	250 V
2612	4822 121 42376	470 nF	250 V
2617	4822 122 32771	1.5 nF	2000 V
2817	4822 122 20039	270 pF	2000 V
2638	4822 124 21923	3.3 µF	250 V
2651	4822 121 50627	470 nF	250 V
2654	4822 122 32769	2.2 nF	1000 V
2655	4822 122 32769	2.2 nF	1000 V
2656	4822 122 32769	2.2 nF	1000 V
2657	4822 122 32769	2.2 nF	1000 V
2659	4822 124 21686	220 µF	385 V
2664	4822 122 32071	2.2 nF	1000 V
2675	4822 121 42589	82 nF	63 V
2690	4822 124 41282	1 µF	50 V
2691	4822 122 20038	47 pF	
2694	4822 122 20039	270 pF	2000 V

1601	4822 253 30174	T125 mA	(for 90°)
1601	4822 253 10074	T315 mA	(for 110°)
1642	4822 253 10057	T800 mA	
1651	4822 253 30025	T2 A	
1704	4822 253 30089	T2,5 A	
1707	4822 253 30089	T2,5 A	
1711	4822 253 10074	T315 mA	

(board)

M4	4822 265 40442	10p
M5	4822 267 40648	5p
M6	4822 264 50149	10p
M7	4822 264 50148	8p
M8	4822 264 50148	8p
M9	4822 267 50591	6p
M10	4822 264 50148	8p
M11	4822 265 30437	3p
M12	4822 265 40422	8p
M13	4822 265 30351	5p
M14	4822 265 30378	4p
M15	4822 265 30389	2p
M16	4822 265 30407	3p
M17	4822 265 40421	6p
M18	4822 265 30389	2p
M19	4822 265 30389	2p

(cable)

M4	4822 267 50637	10p
M12	4822 265 40253	8p
M13	4822 265 30275	5p
M14	4822 267 40507	4p
M15	4822 267 40653	3p
M16	4822 265 30273	3p
M17	4822 267 30546	6p
M18	4822 267 30639	2p
M19	4822 267 30639	2p

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CARRIER PANEL

CNX62	4822 130 90121	
PCD8571P	4822 209 10427	
SAB3035	4822 209 11012	
TDA1520AQ	4822 209 70223	(for 2× 15 W)
TDA1520BQ	4822 209 70021	(for 2× 10 W)
TDA3653AQ	4822 209 83263	(for 90°)
TDA3654Q	4822 209 83351	(for 110°)
TDA4580	4822 209 70018	
TDA8370	4822 209 70178	

BC369	5322 130 44593	
BC547	4822 130 44257	
BC548	4822 130 40938	
BC548C	4822 130 44196	
BC556	4822 130 40989	
BC557	4822 130 44256	
BC558	4822 130 40941	
BC558B	4822 130 44197	
BD234	4822 130 40917	
BD826	4822 130 41774	
BD943	5322 130 44921	
BF819	4822 130 42159	
BUT12A	4822 130 43919	
2SD1577PV	4822 130 43921	

BAS11	4822 130 41273	
BAV21	4822 130 30842	
BT151F-500R	4822 130 20194	
BY228	4822 130 41275	
BY229F-200	4822 130 33529	
BY229F-600	4822 130 33531	
BYD33D	4822 130 42488	
BYD33G	4822 130 42489	
BYD33J	4822 130 42606	
BYV27-150	4822 130 31628	
BYW95C	4822 130 41602	
BZV85-C5V1	4822 130 31456	
BZX55-B5V1	4822 130 33524	
BZX55-B6V2	4822 130 33525	
BZX55-B9V1	4822 130 33668	
BZX55-C33	4822 130 33684	
BZX79-C2V7	5322 130 34563	
BZX79-C3V9	4822 130 31981	
BZX79-C4V7	4822 130 34174	
BZX79-C12	4822 130 34197	
BZX79-C18	4822 130 31024	
BZX79-C33	4822 130 34142	
BZX79-C47	4822 130 34383	
HZ7A3	4822 130 33523	
OF705-8V2	4822 130 33633	
OF705-30	4822 130 32807	

SF2D41	4822 130 20193	
1N4148	4822 130 31438	
1N5061	4822 130 31933	

5027	4822 157 50961	
5555	4822 157 52681	
5567	4822 157 50964	
5601	4822 158 10728	(for 110°)
5601	4822 156 21293	(for 90°)
5611	4822 157 52472	(for 110°)
5611	4822 158 10553	(for 90°)
5612	4822 157 52688	(for 110°)
5612	4822 156 21332	(for 90°)
5619	4822 157 52505	
5620	4822 140 10294	Line output
5832	4822 146 10111	Line driver
5637	4822 157 51157	
5642	4822 157 52506	
5643	4822 157 52506	
5644	4822 157 52506	
5646	4822 157 52506	
5651	4822 157 52505	
5652	4822 157 52505	
5663	4822 146 21121	SOPS transformer
5687	4822 156 10769	
5697	4822 157 52407	
5698	4822 157 52407	

Various

1921	4822 242 70868	Crystal 4 MHz
1925	4822 138 10138	Battery 1,2 V
	4822 267 60172	SCART socket
	4822 276 11237	Switch SK2
	4822 410 24151	Knob on SK2
	4822 273 30324	Switch SK4
	4822 256 30274	Fuse holder 1651
	4822 267 30631	Socket var. level
1224	4822 280 20213	Relais
	4822 492 41268	Spring fix. TS7599
	4822 492 63339	Spring fix. TS7618
	4822 492 62907	Spring fix. other transistors and IC's
	4822 255 40527	Isolation plates
	4822 320 20097	EHT cable
	4822 320 20126	Focus cable long
	4822 320 40136	Focus cable short
	4822 267 50606	Connector on focus cable

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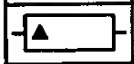
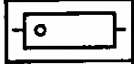
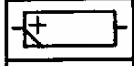
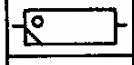
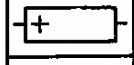
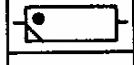
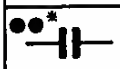
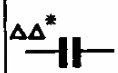
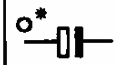
SYMBOLS USED IN CIRCUIT DIAGRAMS

SYMBOL	TYPE	$P_{70°}$ amb.	TOLERANCE	SERIES
	SFR16T	0.5	1E - 3M 5%	E24
	SFR25H	0.5	1E - 10M 5%	E24
	MRS25	0.6	1E - 1M 1%	E24
	MR30	0.5	1E - 1M 1% (2%)	E24
	VR37	0.5	220K - 33M 5%	E24
	PR37	1.6	1E - 1M 5%	E24
	VR68	1	100K - 68M 5%	E24
	MRS 16T	0.4	10R-100K	E24/E96

SYMBOL	TYPE	VOLTAGE DC	TOLERANCE
	POLYESTER FLATFOIL	SEE NOTE	10%
	PLATE CERAMIC	SEE NOTE	OEPENOING ON CAPACITY
	ELCO MINIATURE SINGLE	SEE NOTE	-10+50%
	ELCO SINGLE ENOEO	SEE NOTE	±20%

NOTE:

*

a = 2.5V
b = 4V
c = 6.3V
d = 10V
e = 16V

f = 25V
g = 40V
h = 63V
j = 100V
l = 125V
m = 150V
n = 160V

q = 200V
r = 250V
s = 300V
t = 350V
u = 400V
v = 500V
w = 630V

x = 1000V
z = 1600V
A = 1.6V
B = 6V
C = 12V
O = 15V

E = 20V
F = 35V
G = 50V
H = 75V
I = 80V

39 301 A13/617

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ELECTRICAL ADJUSTMENTS

D. ADJUSTMENTS TO THE CHROMINANCE PANEL (Fig. 6)

Remark:
If the set is only suitable for receiving PAL signals, the adjustments 1,2 and 3 have to be carried out. If the set is suitable for receiving SECAM signals too, the adjustments 4,5 and 6 must also be executed.

1. Chroma subcarrier oscillator

Apply a colour-bar pattern.
Connect point 11 of IC7250 or point 17 of IC7320 to ground.
Adjust 2272 so that colour pattern on the screen is practically stationary. Remove the interconnection.

2. Deley line

Apply a generator signal from a PM5509 or PM5519.
Set the generator to 'DEM'. Set contrast and brightness to normal and set the saturation control to 3/4 of its range.
Adjust 3268 so that the venetian-blinds effect in the 3rd bar is minimal.
Subsequently, adjust 5267 until the venetian-blinds effect in the 1st and the 4th bar is also minimal
Readjust 3268 if necessary.

3. Chrome trap in the luminance circuit.

Use a colour-bar pattern and set the receiver controls to their normal settings.
Connect an oscilloscope to point 7M10 and adjust 5252 for minimum amplitude of the chrominence signal which is situated on the various brightness steps of the luminance signal.

4. "Circuit cloche"

Apply an aerial signal or generator signal.
Adjust the receiver normally.
Connect an oscilloscope to point 15 of IC7320.
Adjust 5258 at maximum amplitude

5. SECAM identification

Apply a SECAM signal with line identification and adjust the receiver to its normal setting. Connect a voltmeter ($R_i \geqslant 10\ M\Omega$) to point 21 of IC7320 and earth. Adjust 5263 for maximum direct voltage.

6. SECAM demodulators

Apply a SECAM test bar pattern and adjust the receiver to its normal setting. Connect an oscilloscope to 4M10.
Adjust 5320 so that the level of the white and/or black bar is situated at the same level as the flyback. Subsequently, connect the oscilloscope to 5M10 and adjust 5325 in the same way as 5320.

E. ADJUSTMENTS TO THE STEREO DECODER (Fig. 7.)

Remark
When the aligning instructions refer to a generator signal, the signal originating from colour test-pattern generator PM5519GX is meant.

1. The 5.5 MHz audio section (6 MHz for U.K.)

Apply a transmitter or generator signal of which the sound carrier is frequency modulated (at e.g. 1 kHz).
Select the mono position on the generator.
Adjust 5100 and 5101 for maximum sound volume.
Subsequently, adjust 5102 for minimum interference in the sound.

2. The 5.742 MHz audio section (6.242 MHz for U.K.)

a. Apply a transmitter signal with 2 sound carriers.
Both sound carriers should be frequency modulated (at e.g. 1 kHz) and the 2nd sound carrier should be provided with the pilot signal for the 2nd language.
Select the stereo position on the receiver's stereo/mono switch and switch the TV receiver to mono-channel II position by means of key "I-II" on the remote control transmitter.

b. Or apply a generator signal.
Select the stereo position on the generator and depress key "1(L), 1+2(R)".

Subsequently, adjust 5106 and 5107 for meximum sound volume and 5108 for minimum interference in the sound.

3. Stereo matrix

Apply a generator signal.
Select the stereo position on the generator and depress key "1(L), 1+2(R)".
Select the stereo position on the receiver's mono/stereo switch.
Connect an oscilloscope to pin 4 of connector M5.
Adjust 3111 for minimum signal.

F. ADJUSTMENTS TO THE TELETEXT DECODER

1. Connect point 22 of IC7780 to ground.
Adjust 2788 for a free-running frequency of 6.010 MHz ± 2,5 kHz at pin 17 of IC7780 with the aid of a frequency counter.

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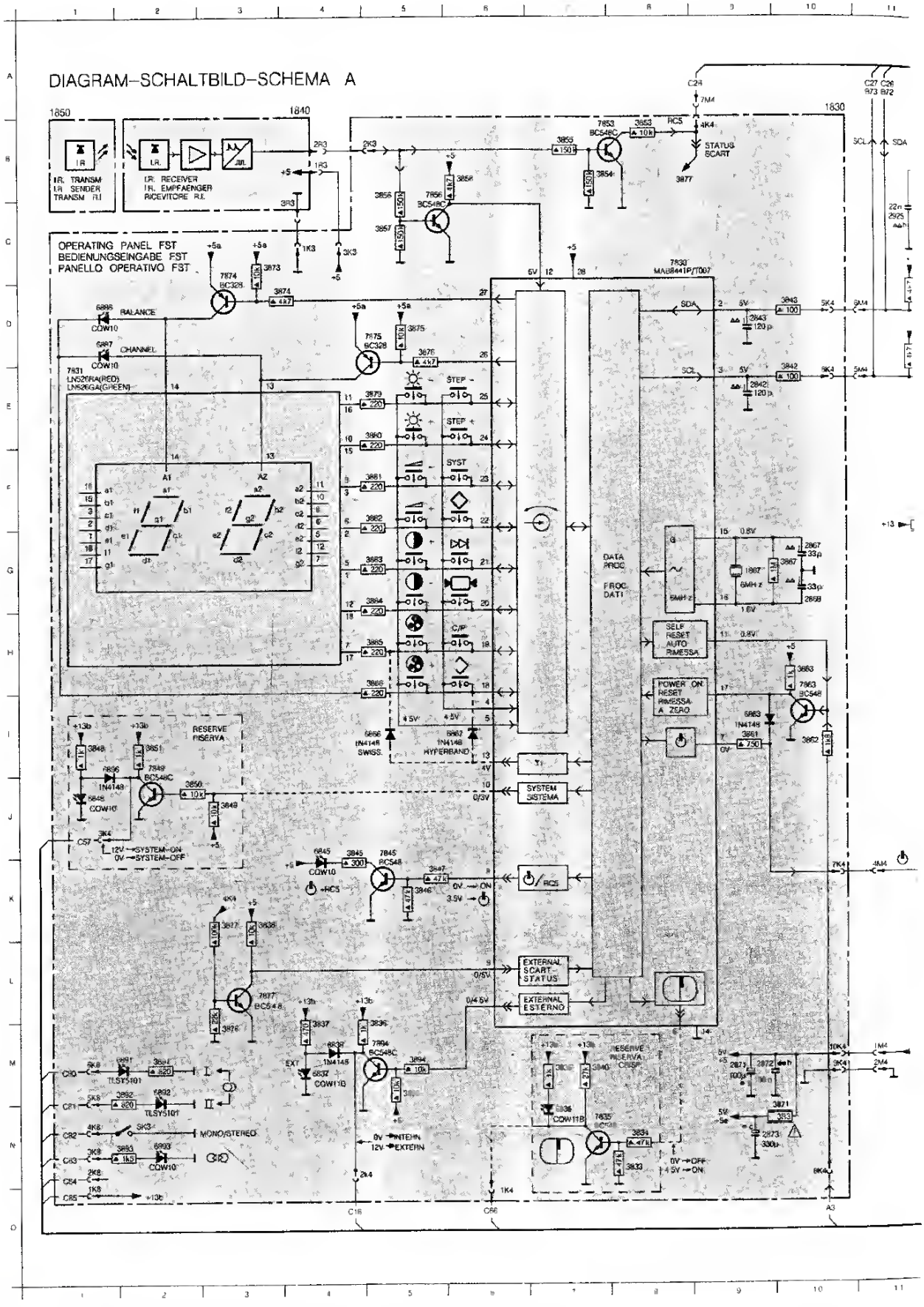

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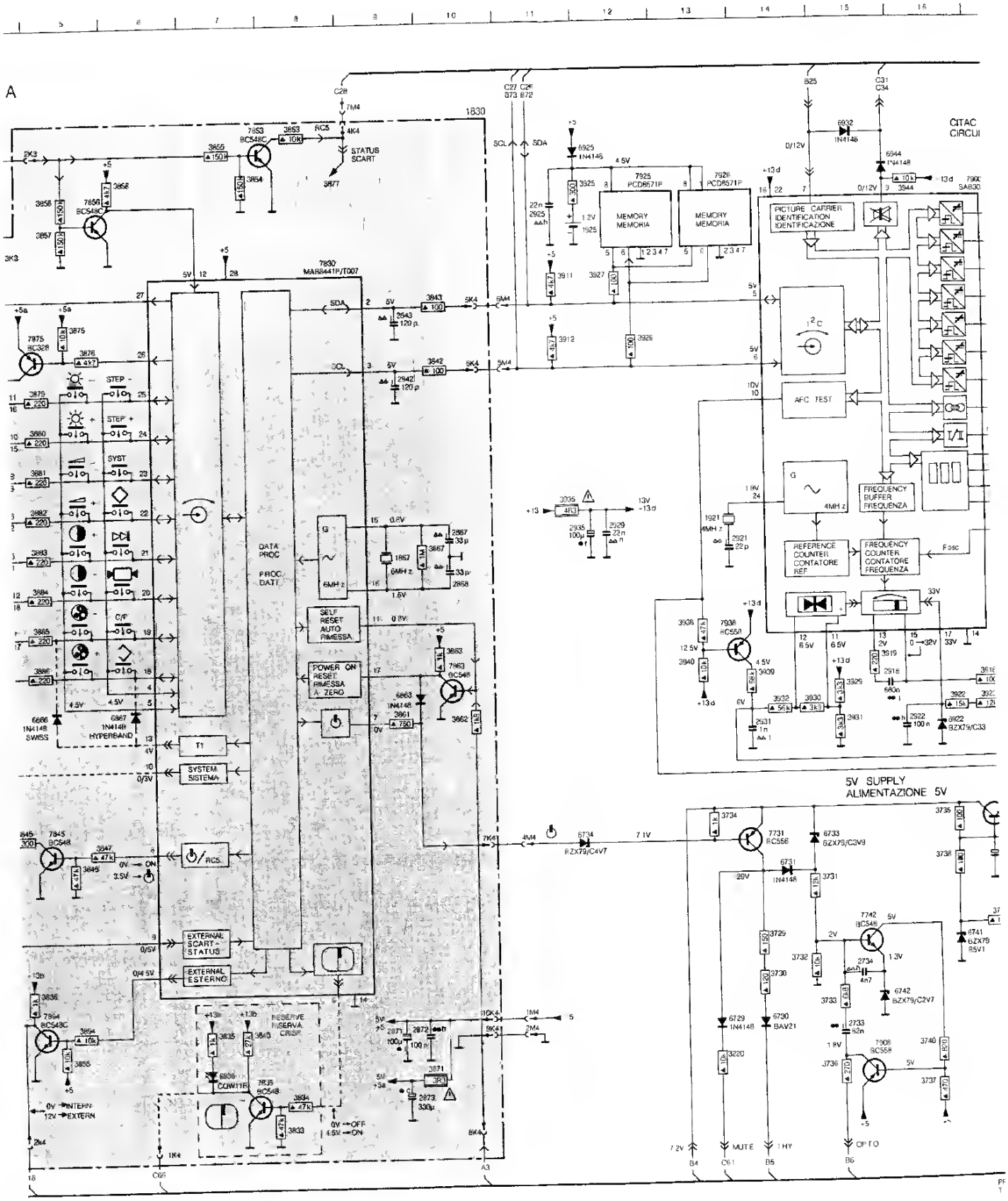

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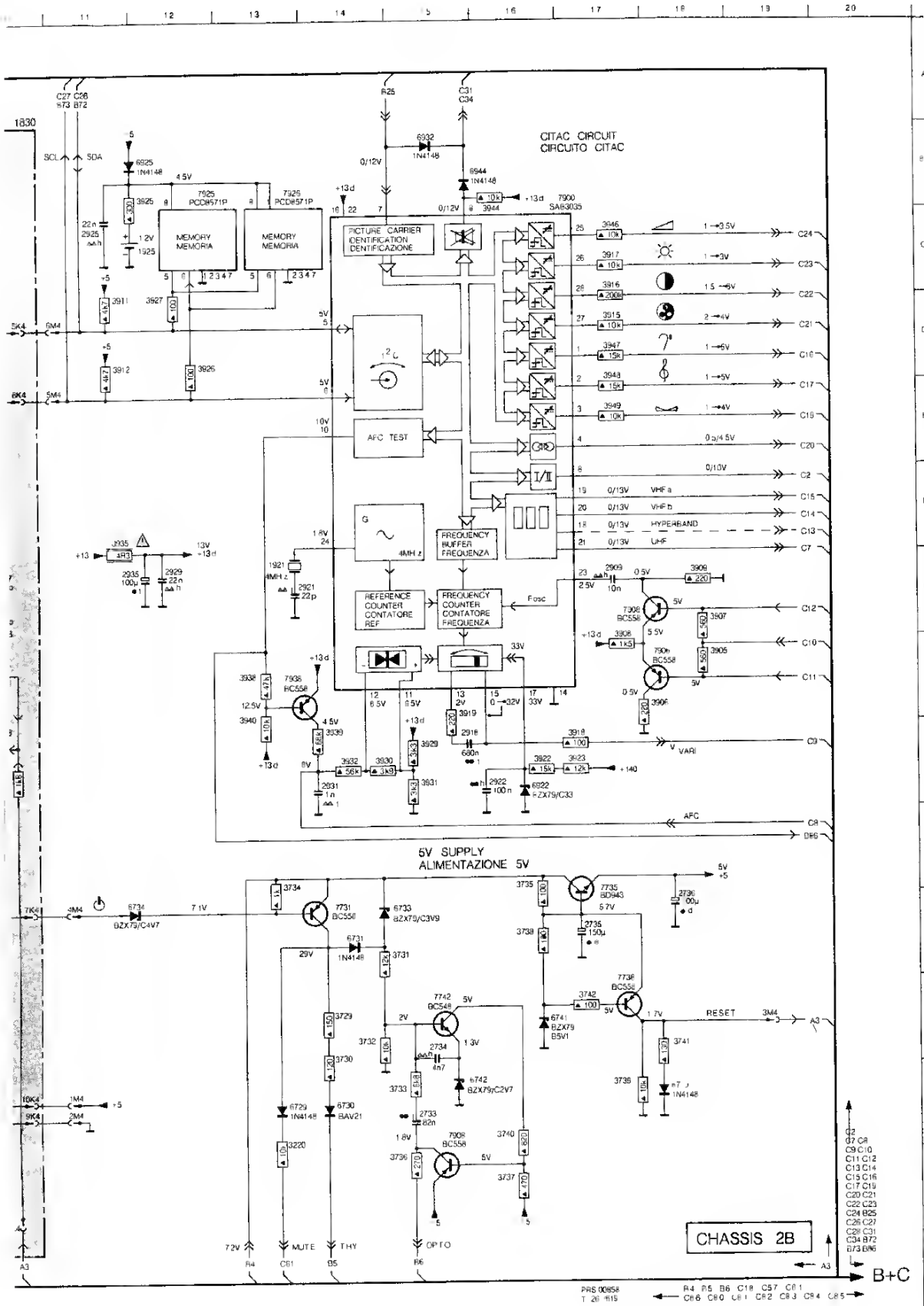

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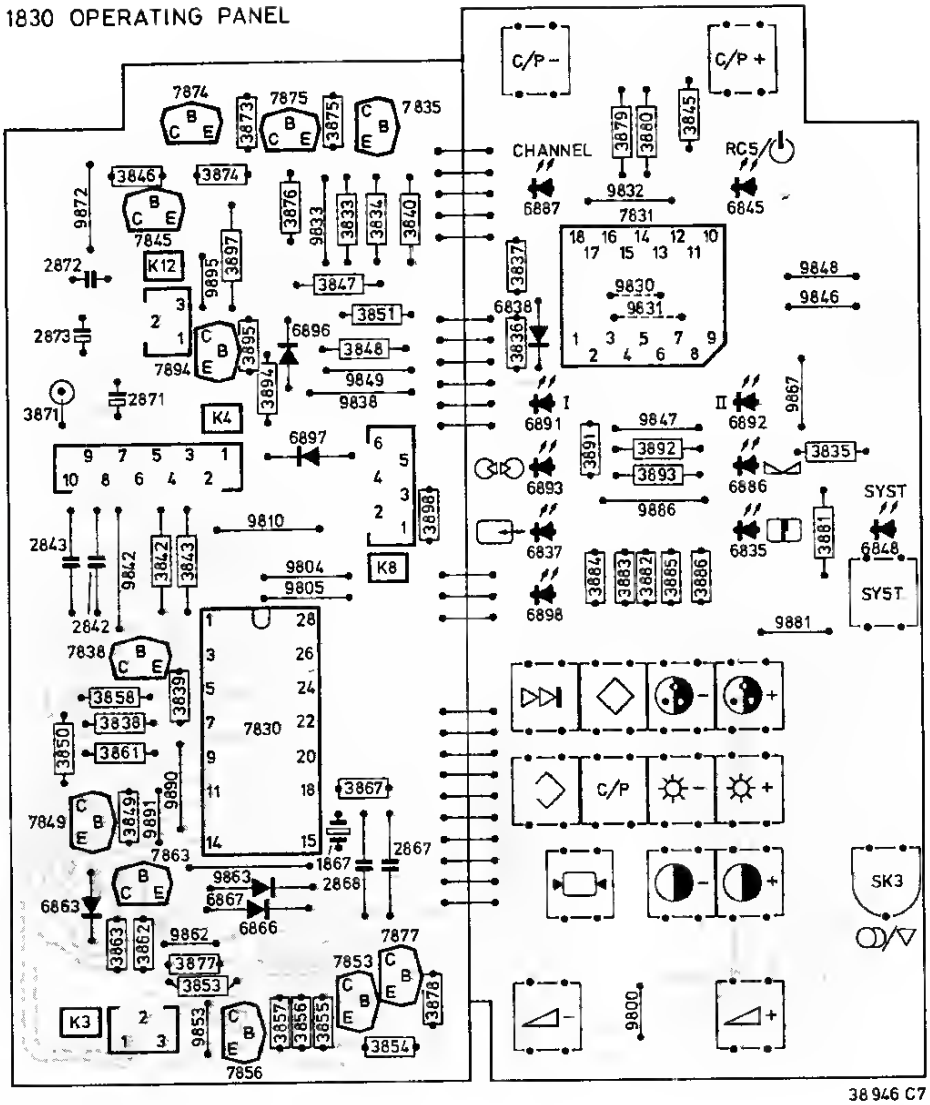
1830 OPERATING PANEL



OPERATING PANEL 1830

LN526RA	4822 130 31652	
MAB8441P-T007	4822 209 11238	
BC328	4822 130 44104	
BC548	4822 130 40938	
BC548C	4822 130 44196	
CQW10	4822 130 31512	
CQW11B	4822 130 42242	
TLSY5101	4822 130 33522	
1N4148	4822 130 31438	

(cable)

K3	4822 265 30273	3p
K4	4822 267 50637	10p
K8	4822 267 30546	6p

3871	4822 111 30593	3,3 Ω	0,33 W

Various

1867	4822 242 70932	Crystal 6 MHz
	4822 276 11721	Switch blue
	4822 276 11719	Switch green
	4822 276 11722	Switch red
	4822 276 11723	Switch white
	4822 276 11724	Switch C/P + volume
SK3	4822 273 40305	Switch
	4822 255 40524	Led holder 4 fold
	4822 255 40526	Led holder 1 fold
	4822 267 70095	Socket for display

(board)

K3	4822 265 30407	3p
K4	4822 265 40442	10p
K8	4822 265 40421	6p

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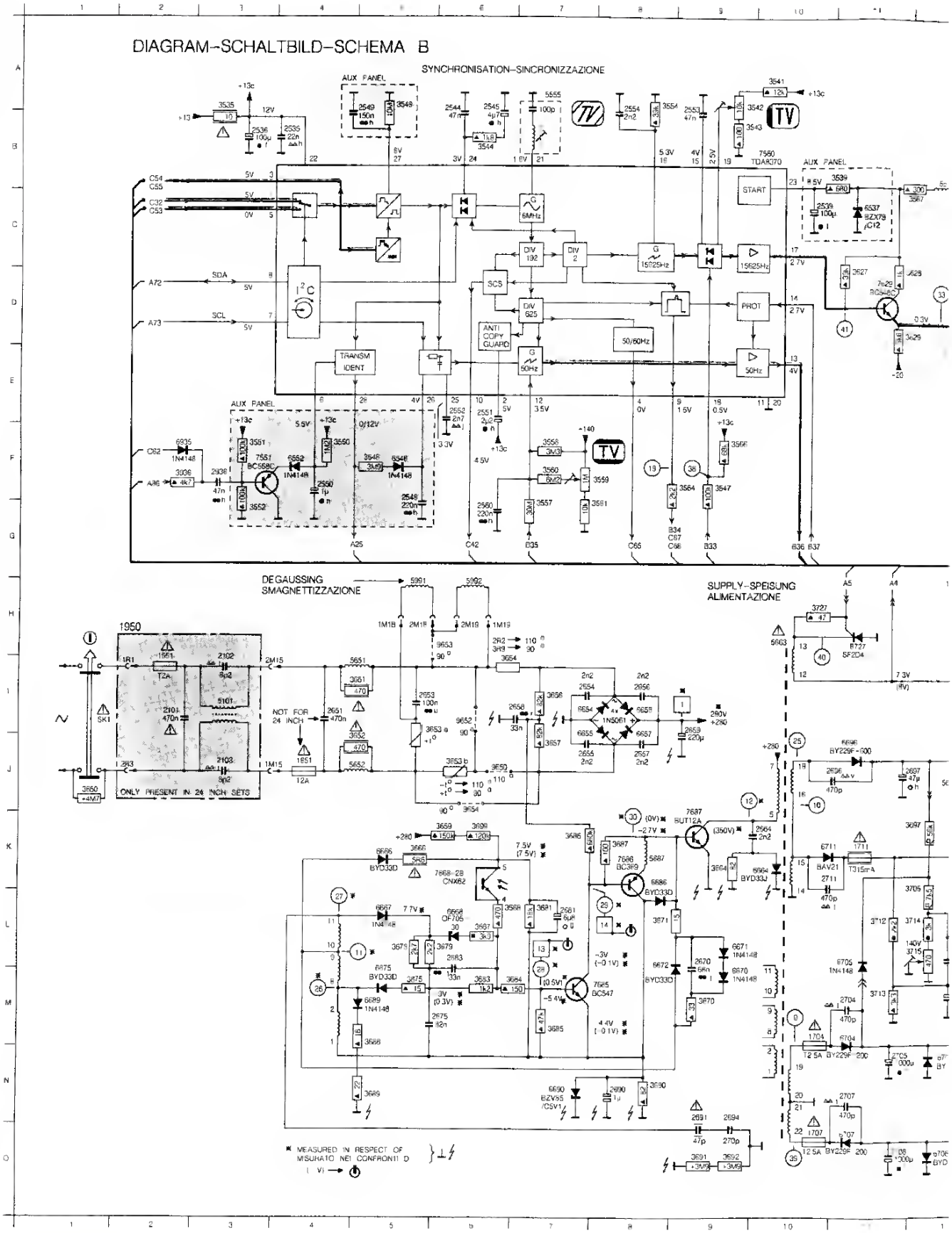

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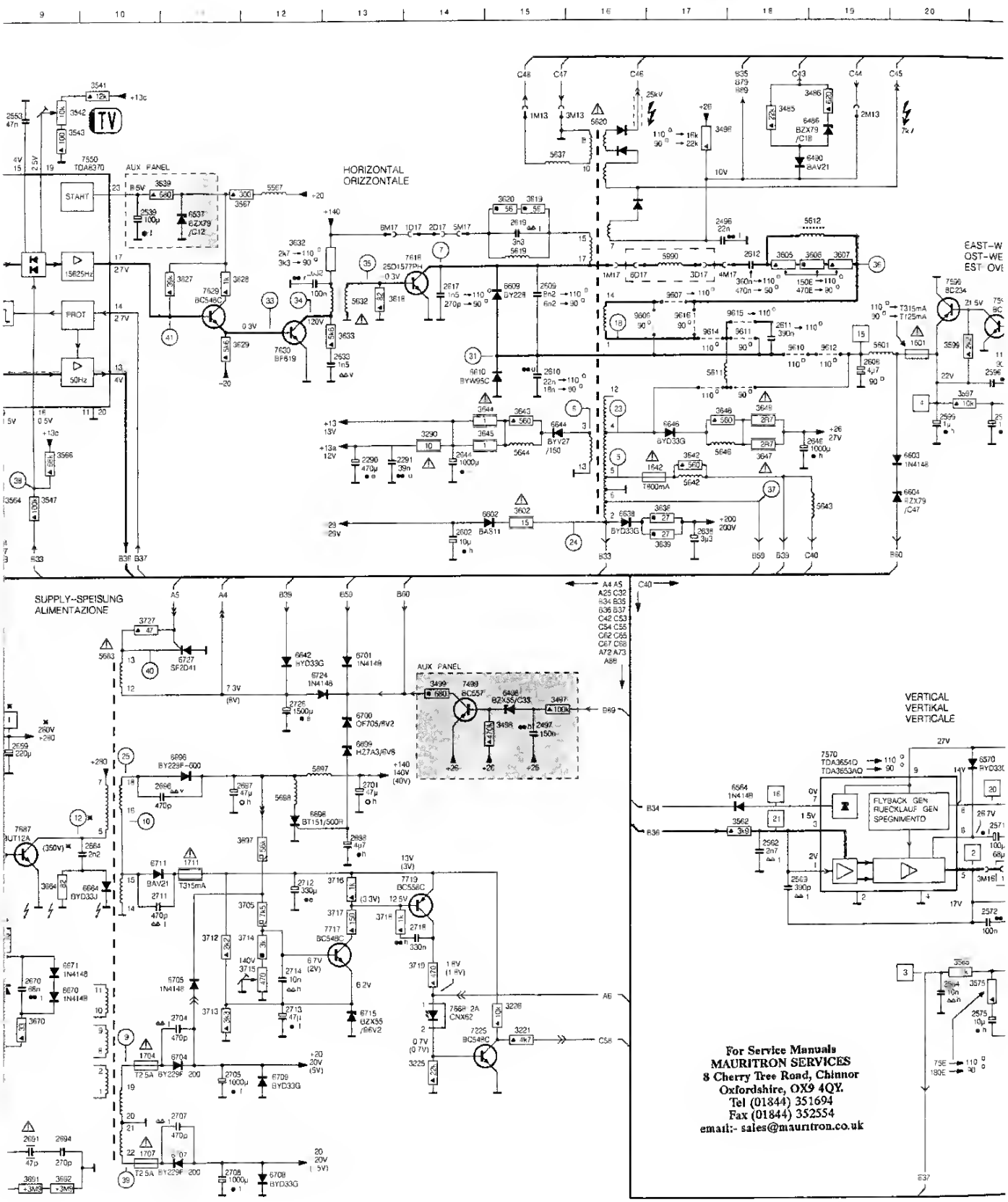

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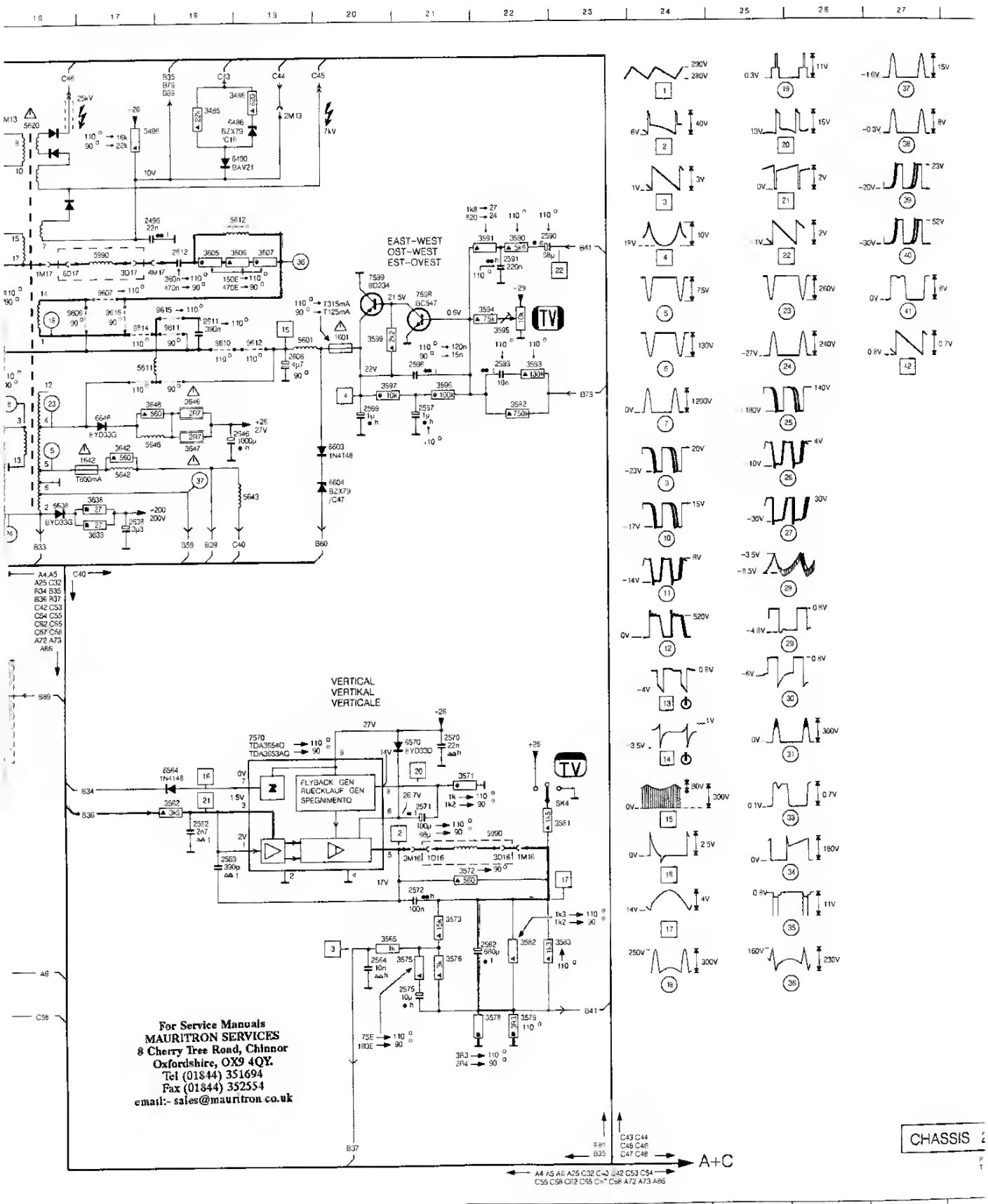

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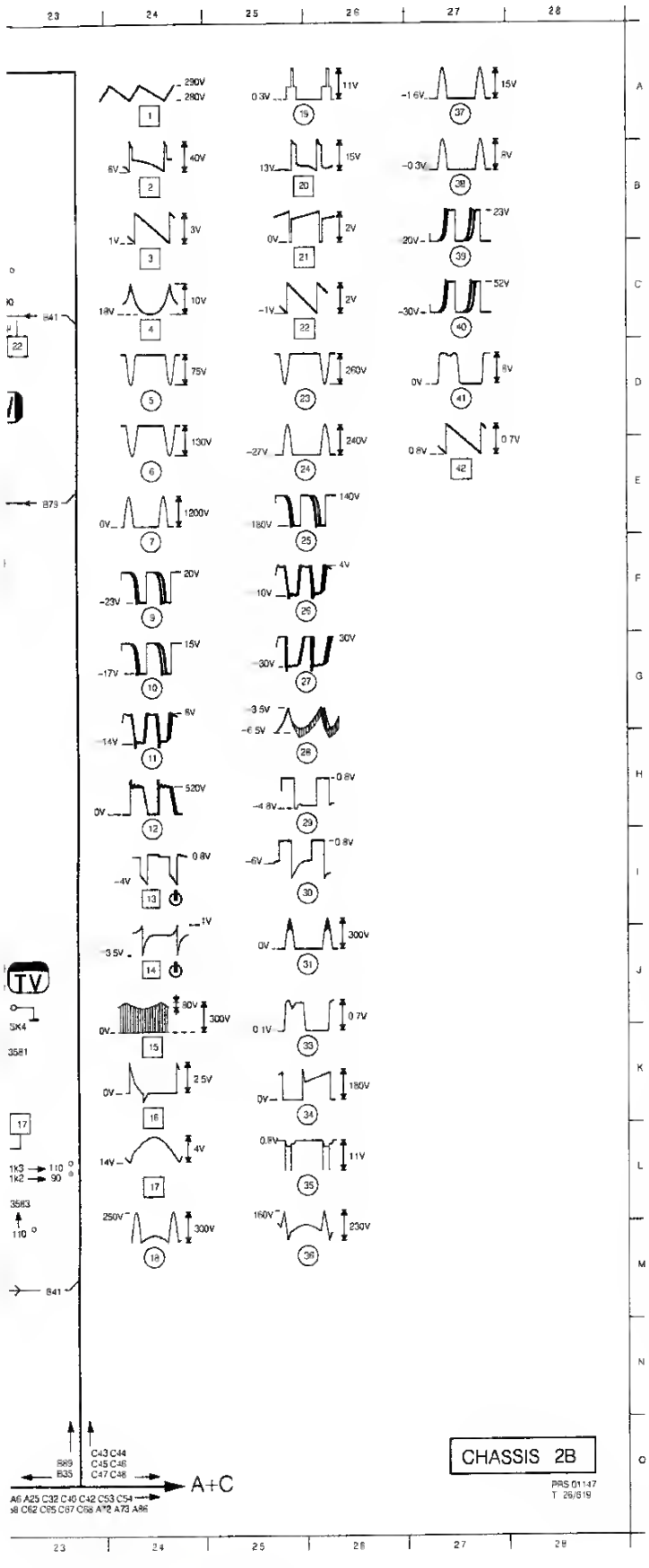

1601	D20	3615	C15	7686	K 8
1642	F17	3620	C15	7687	J 9
1651	J 4	3627	D11	7717	L13
1651	1 2	3628	D12	7719	K14
1704	M10	3629	D12	9807	D17
1707	O10	3632	C12	9810	D18
1711	K11	3633	D13	9811	D18
2101	1 2	3636	F17	9812	D19
2102	1 3	3639	G17	9814	D17
2103	J 3	3642	F17	9815	D18
2290	F13	3643	E15	9816	D17
2291	F14	3644	E15	9850	J 6
2496	C17	3645	F15	9852	1 6
2497	I 15	3646	E18	9853	H 6
2535	R 4	3647	F18	9854	J 6
2536	B 3	3648	E17	9906	D18
2539	C10	3650	J 1		
2544	A 6	3651	I 5		
2545	A 6	3652	J 5		
2549	F 5	3653	J 6		
2548	A 5	3653	I 6		
2550	F 4	3654	I 8		
2551	E 6	3656	I 7		
2552	E 8	3657	J 7		
2553	A 9	3659	K 8		
2554	A 8	3664	K 9		
2560	G 6	3666	K 5		
2562	K18	3667	L 6		
2564	M20	3668	L 7		
2565	K18	3670	M 9		
2570	J 21	3671	L 8		
2571	K21	3675	M 5		
2572	L21	3678	L 5		
2575	M21	3679	L 6		
2582	L22	3681	L 7		
2590	C22	3683	M 6		
2591	C22	3684	M 7		
2593	E22	3685	M 7		
2596	E21	3686	K 7		
2597	E21	3687	K 8		
2599	E20	3688	M 5		
2602	G14	3689	N 5		
2608	E19	3690	N 8		
2609	D15	3691	O 9		
2610	E15	3692	O 9		
2611	D18	3697	K12		
2612	C18	3699	K 6		
2617	O14	3705	K12		
2618	O15	3712	L11		
2632	C12	3713	M11		
2633	E13	3714	L12		
2638	G17	3715	L12		
2644	F14	3716	K13		
2648	F18	3717	L13		
2651	I 4	3718	L13		
2653	I 5	3719	L14		
2654	1 7	3727	H10		
2655	J 7	3936	F 2		
2656	1 8	5101	1 3		
2657	J 8	5555	A 7		
2658	1 7	5587	B12		
2659	1 9	5601	D19		
2664	K10	5611	E17		
2670	L 9	5612	C19		
2675	M 6	5619	C15		
2681	L 7	5620	B16		
2683	L 6	5632	D13		
2690	N 9	5637	B15		
2691	N 9	5642	F17		
2694	N 9	5643	F19		
2696	J11	5644	F15		
2697	J12	5645	F17		
2698	K13	5651	1 5		
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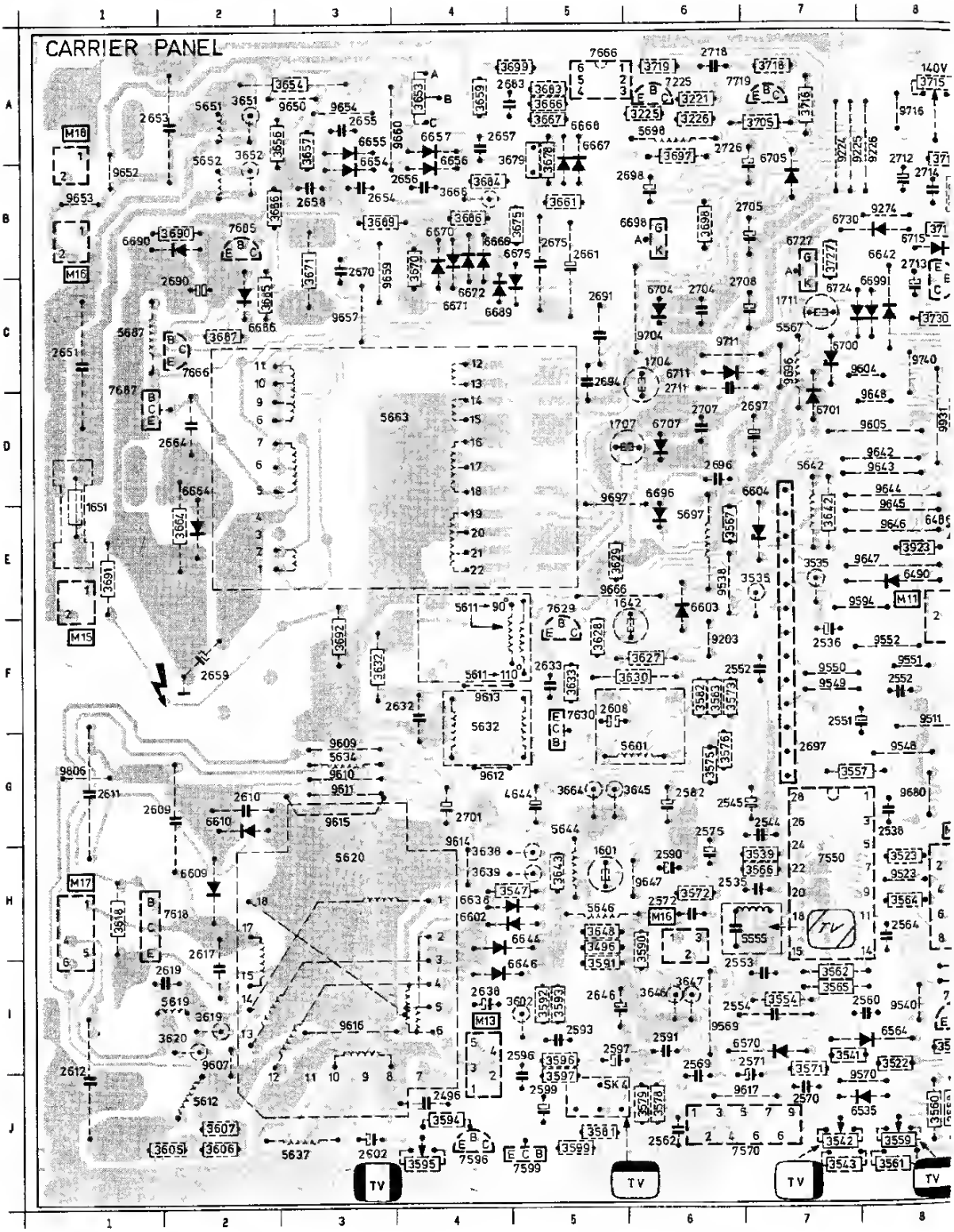

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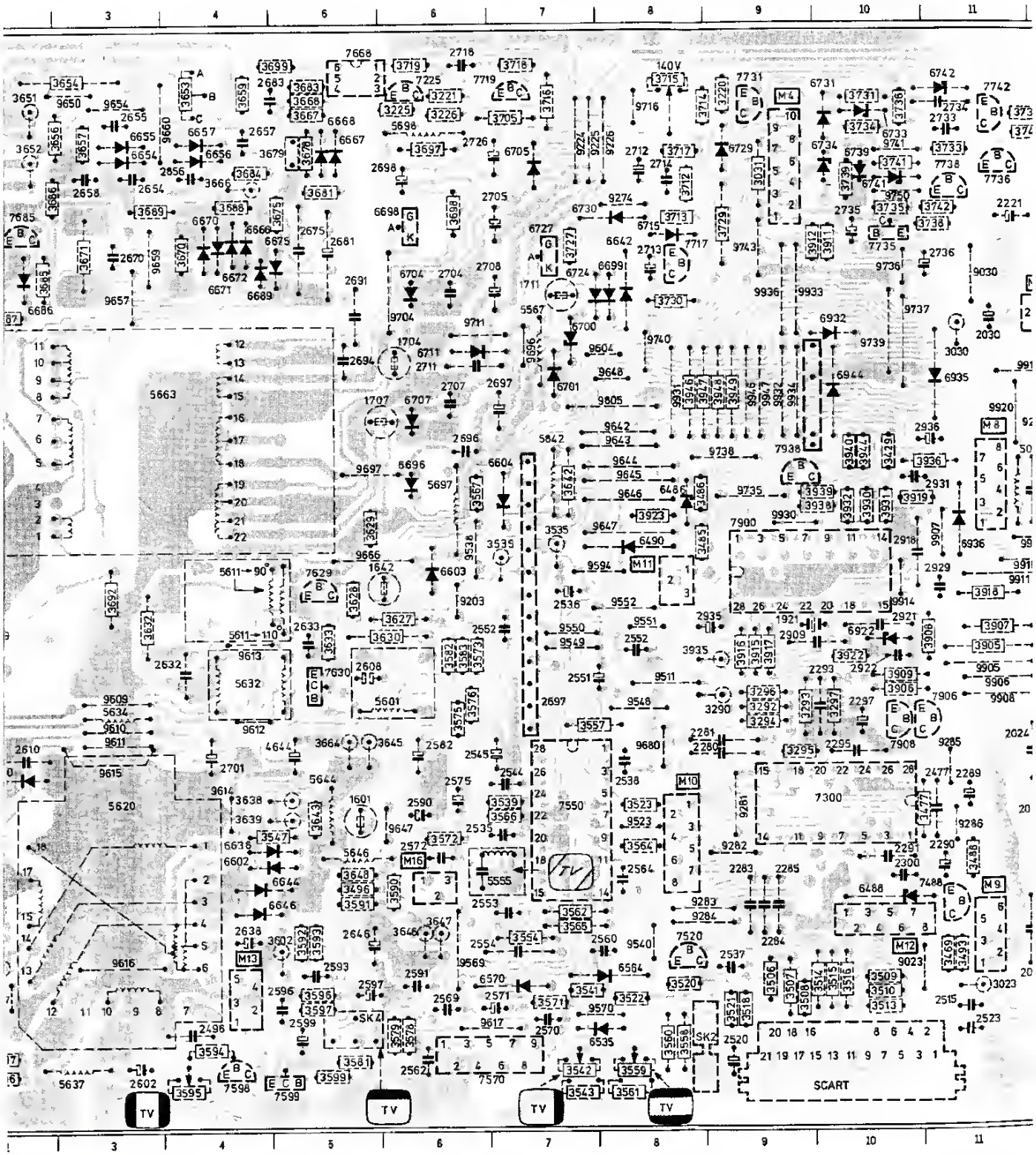

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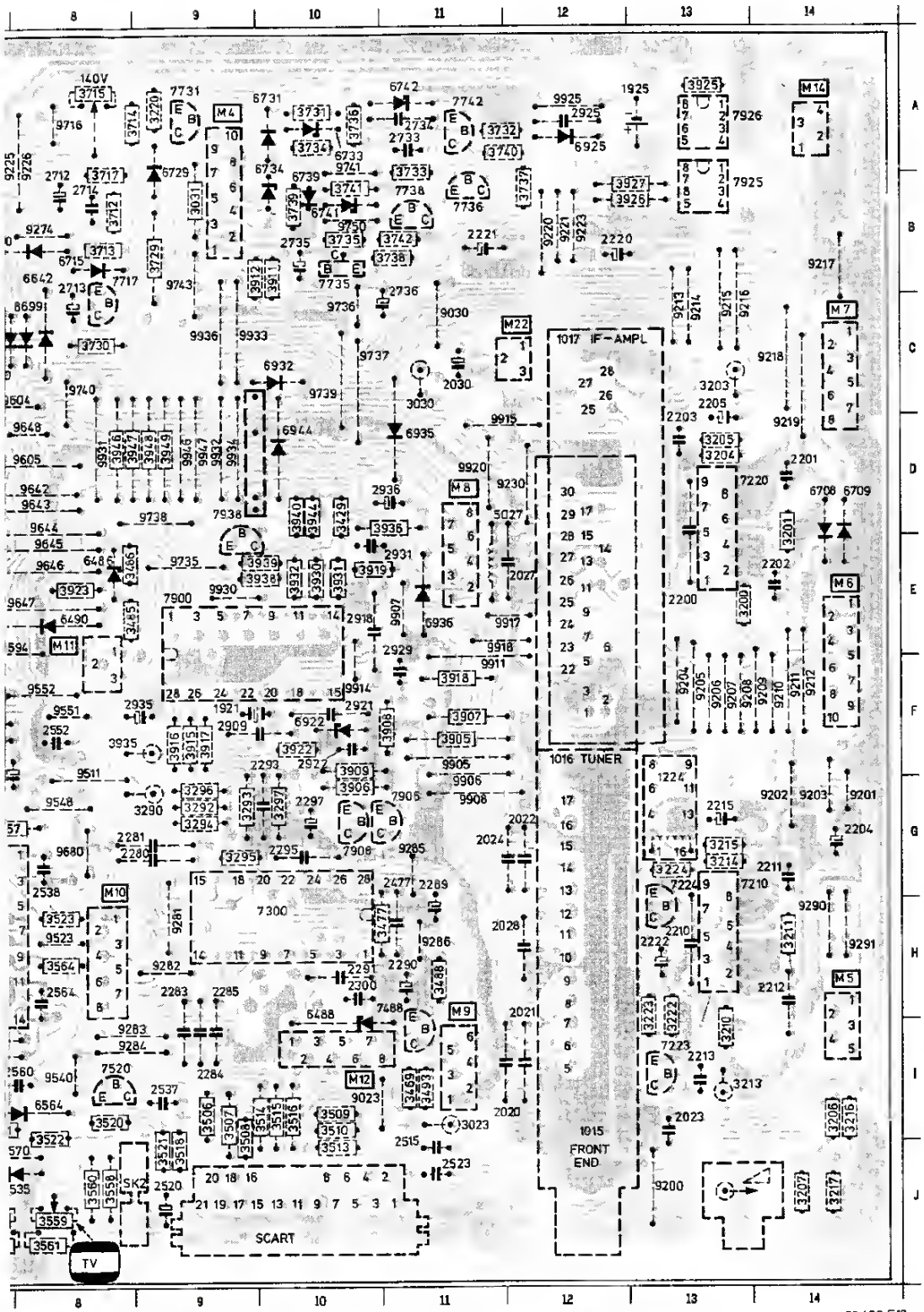

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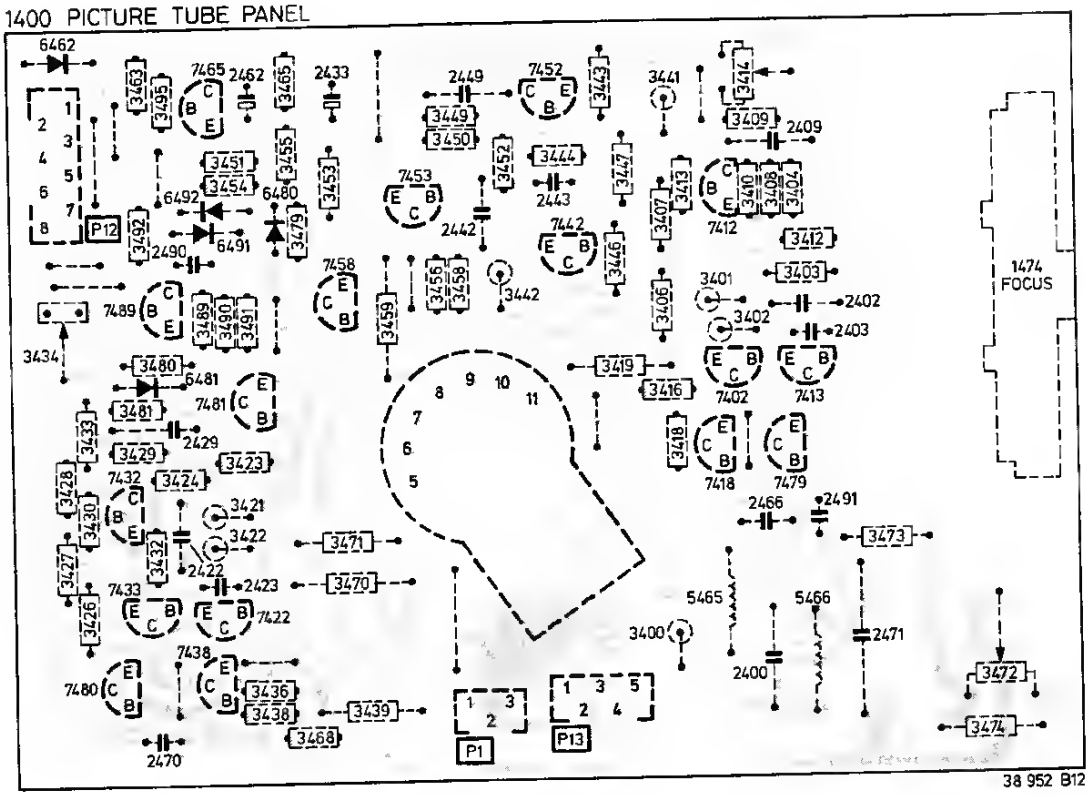
1400 PICTURE TUBE PANEL



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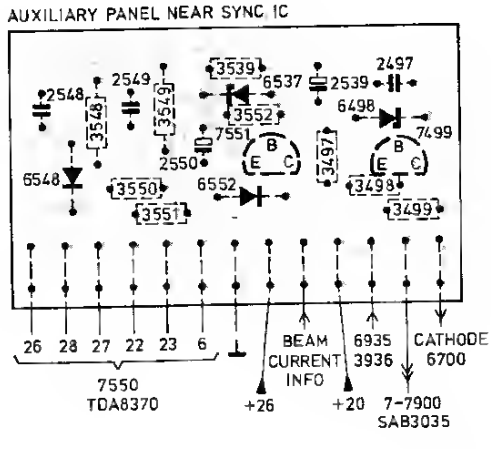

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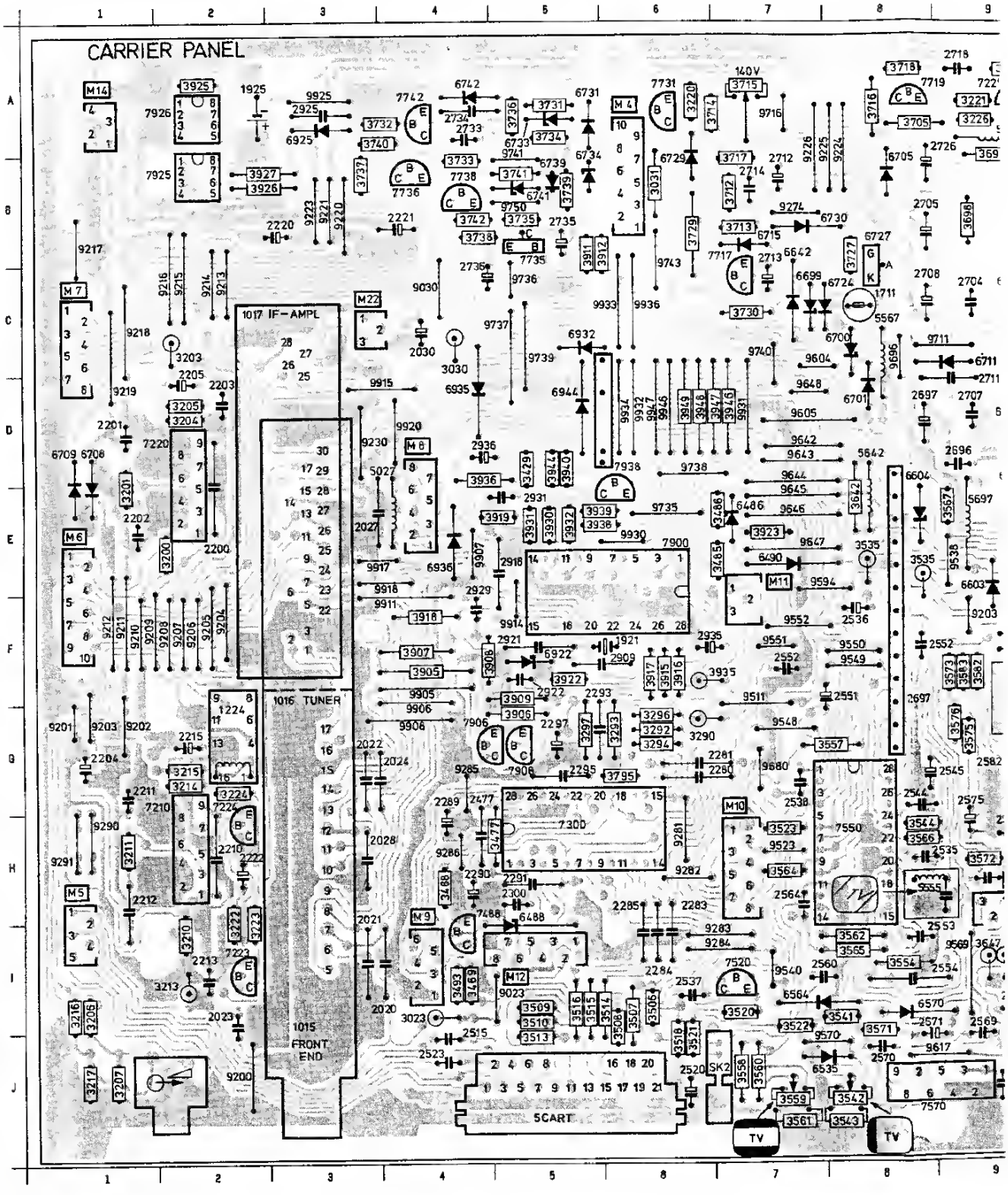

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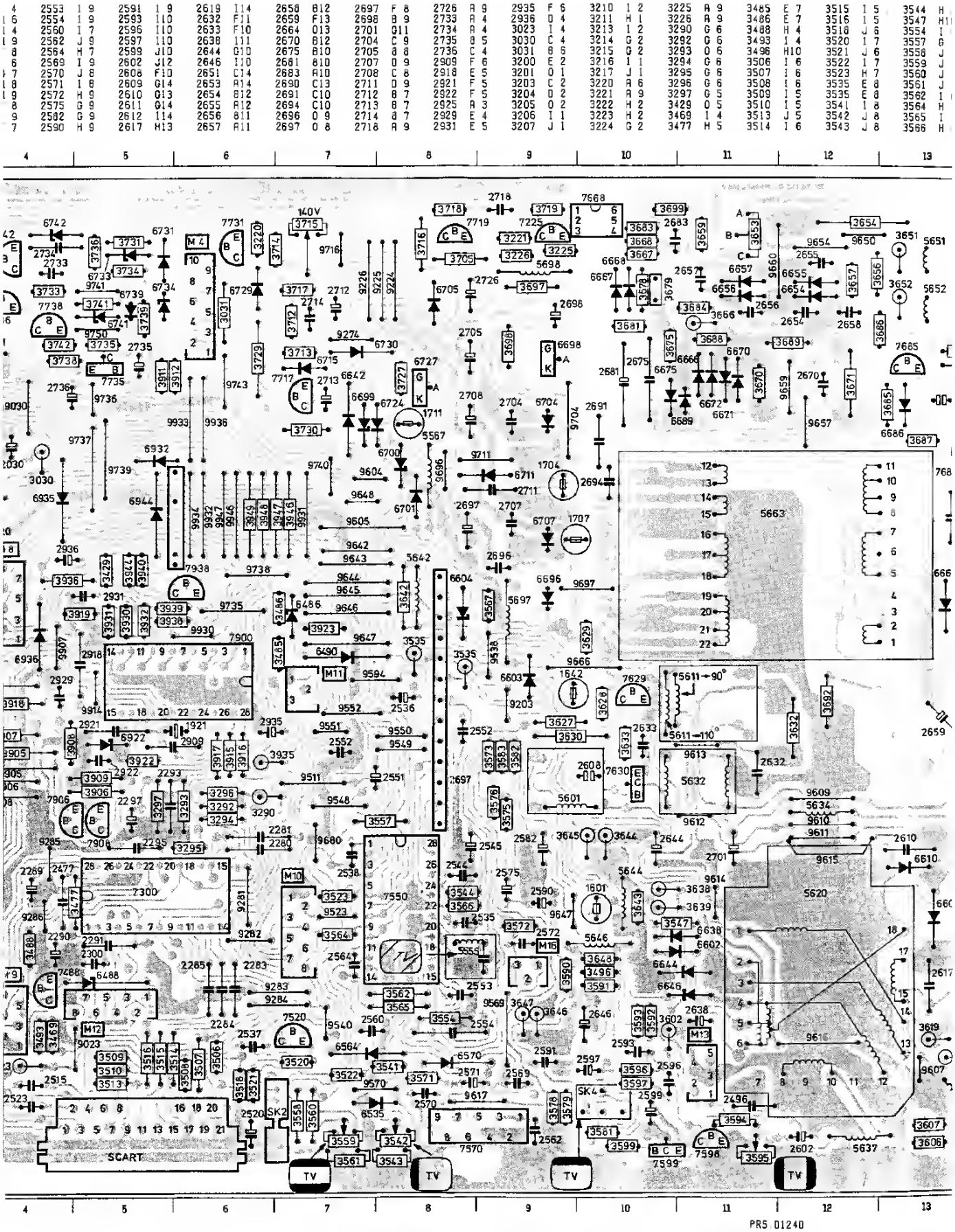

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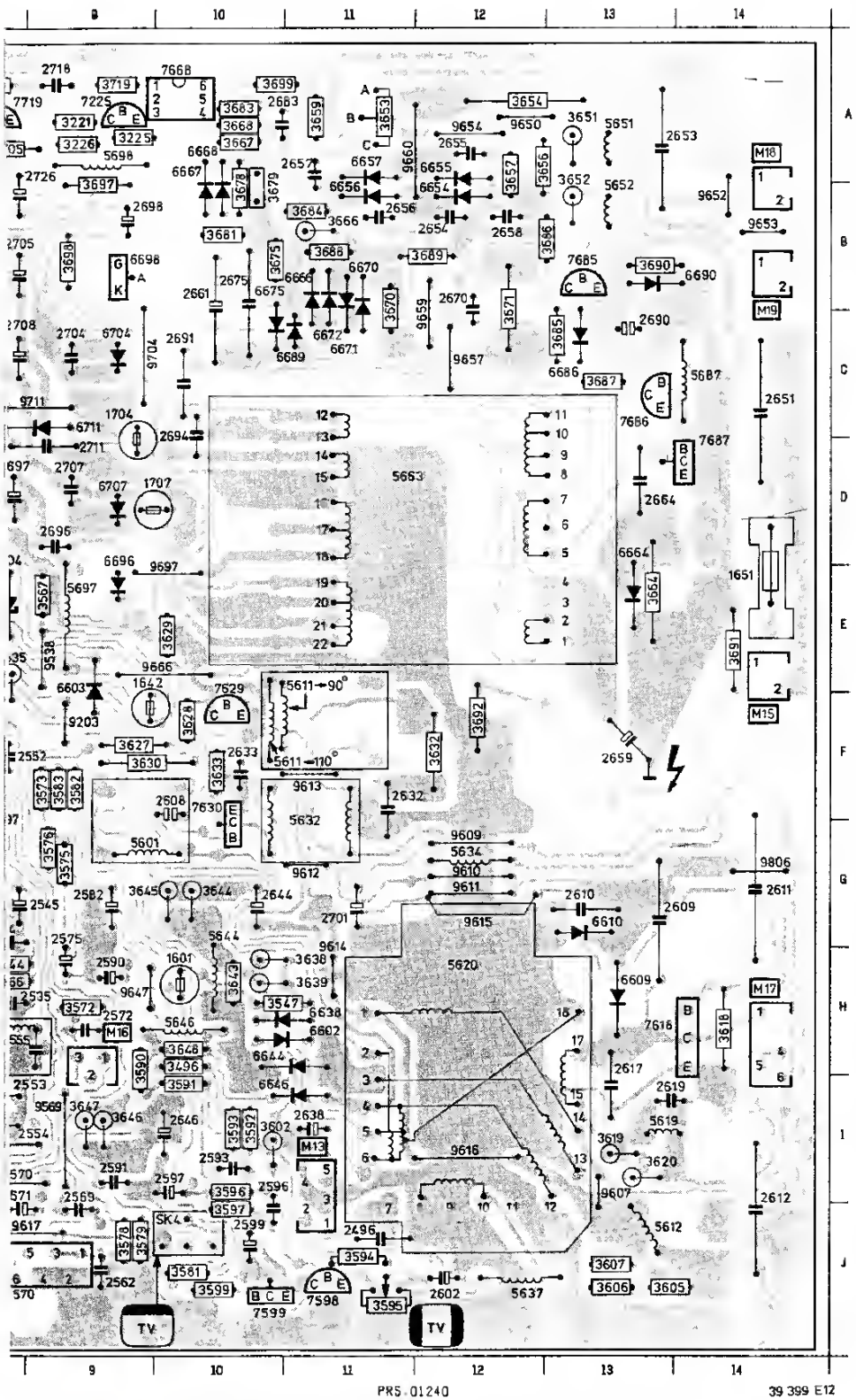

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39 399 E12

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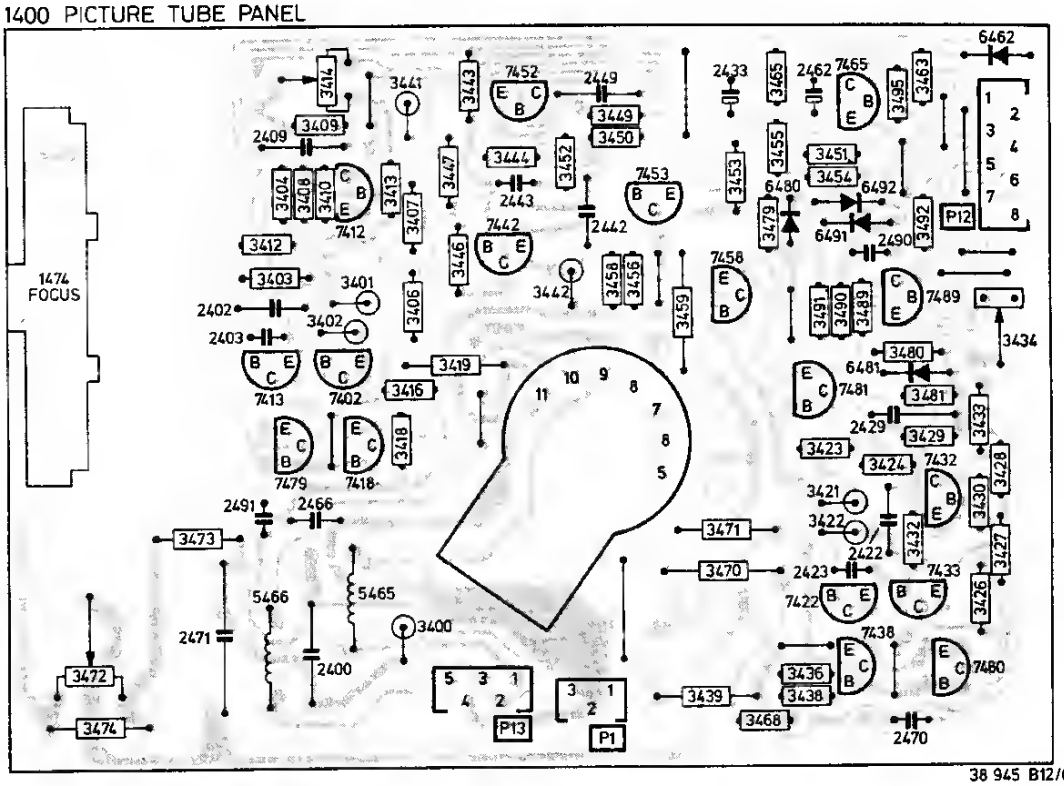
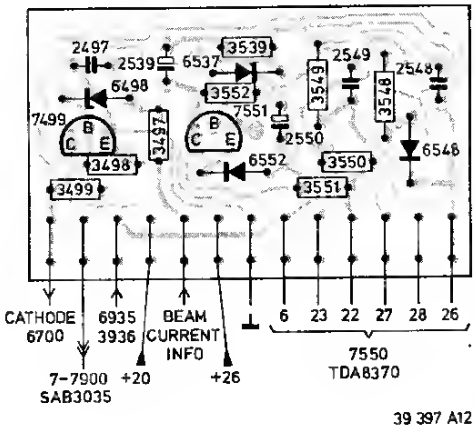
1400 PICTURE TUBE PANEL



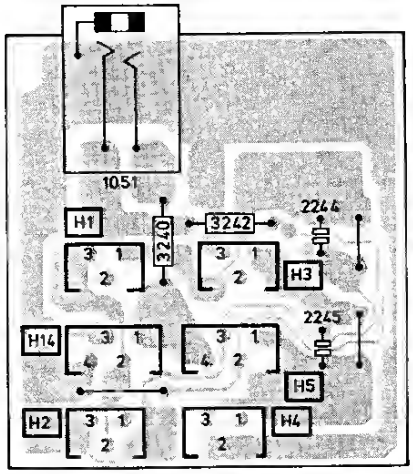
38 945 B12/619

AUXILIARY PANEL NEAR SYNC IC 4822 212 22529

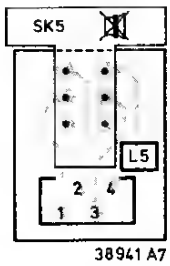


39 397 A12

1250 HEADPHONE PANEL



38 942 A7 (619)



38 941 A7 (619)

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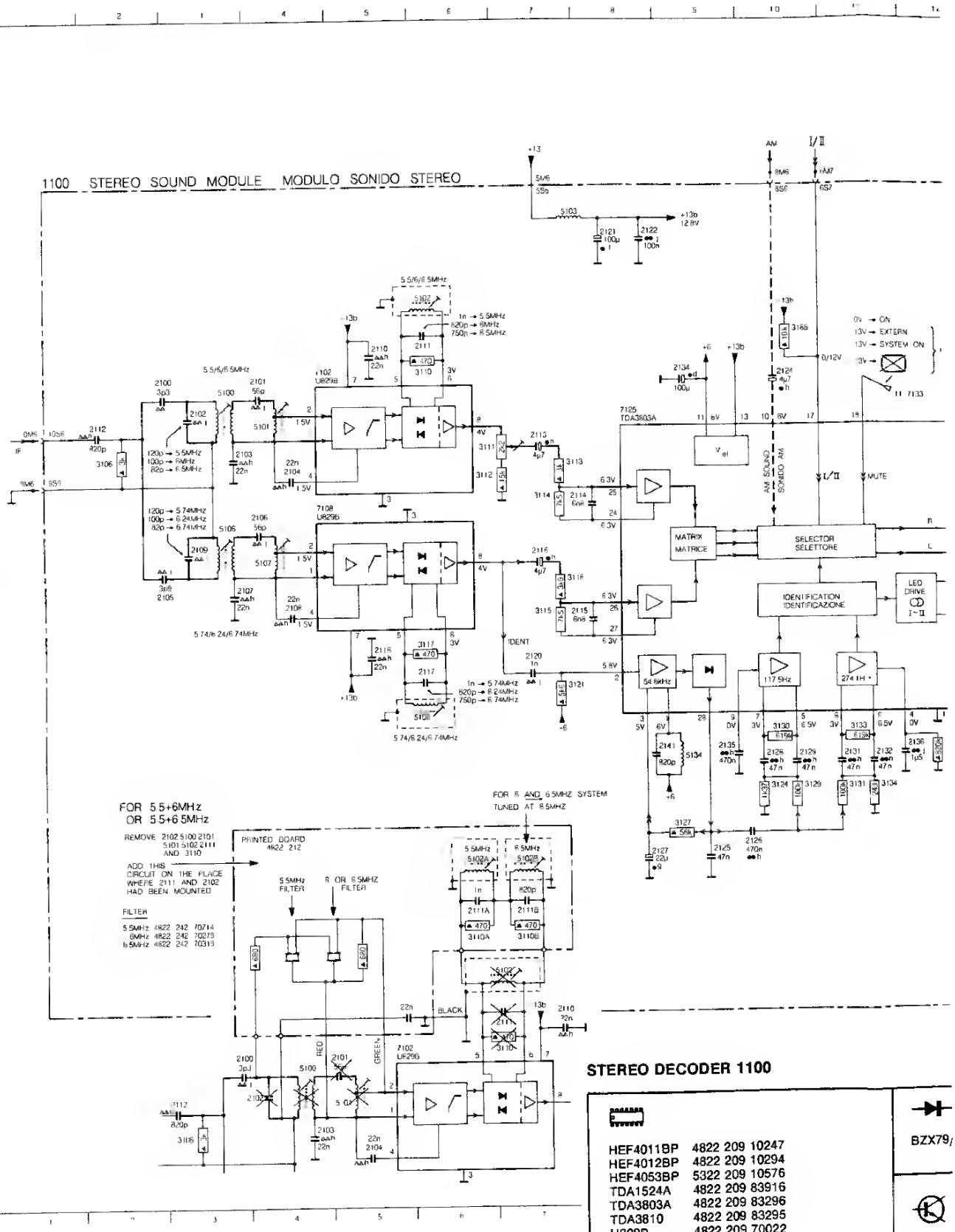

STEREO DECODER 1100

HEF4011BP	4822 209 10247
HEF4012BP	4822 209 10294
HEF4053BP	5322 209 10576
TDA1524A	4822 209 83916
TDA3803A	4822 209 83296
TDA3810	4822 209 83295
U829B	4822 209 70022

BZX79/

BC548

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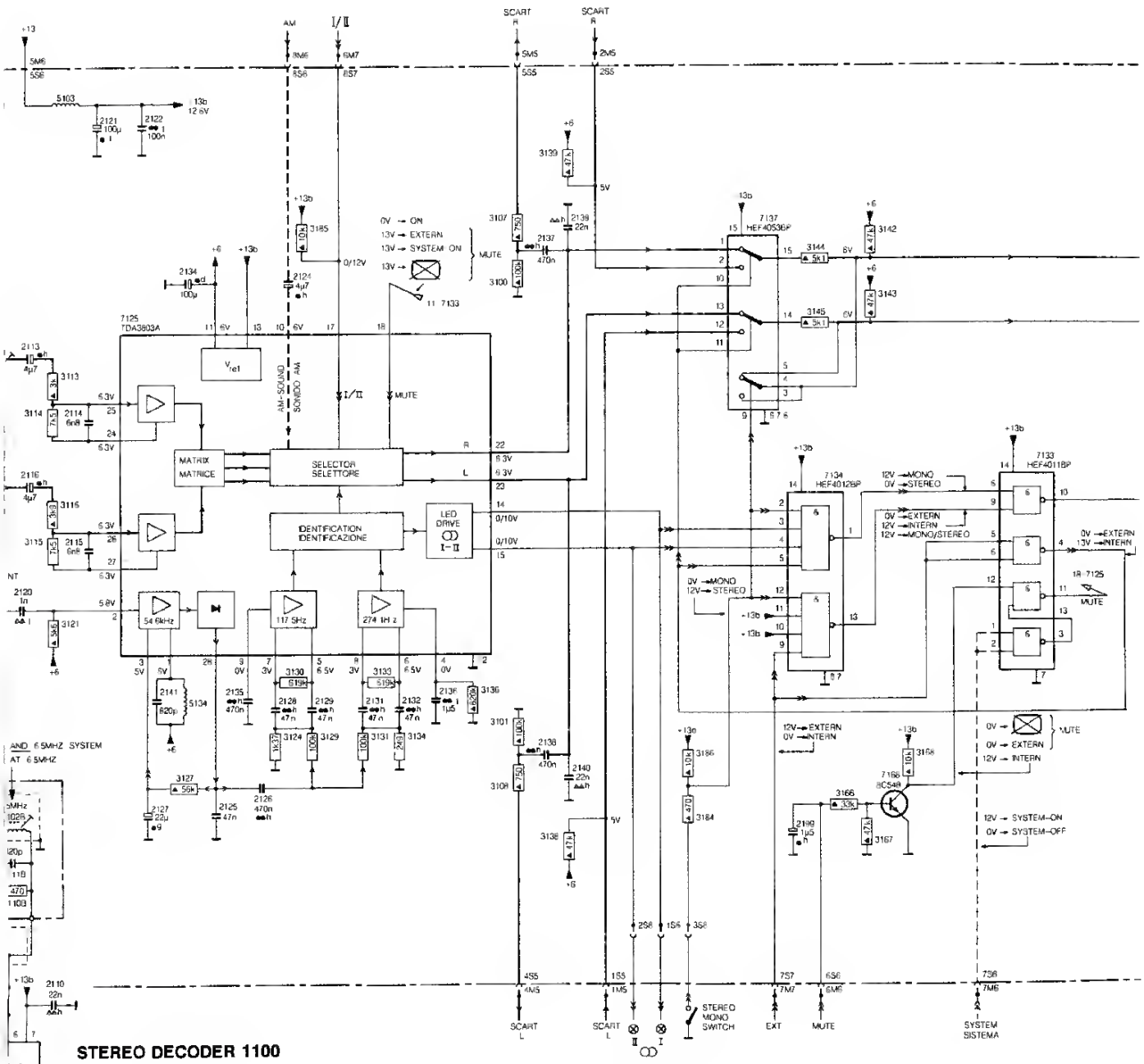

STEREO DECODER 1100

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HEF4012BP	4822 209 10294
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TDA1524A	4822 209 83916
TDA3803A	4822 209 83296
TDA3810	4822 209 83295
U829B	4822 209 70022

BZX79/C5V1 4822 130 34233

BC548 4822 130 40938

5100	4822 157 52508
5101	4822 157 52509
5102	4822 157 52511
5103	4822 157 50964
5106	4822 157 52508
5107	4822 157 52509
5108	4822 157 52511
5134	4822 157 52512

3111
3114
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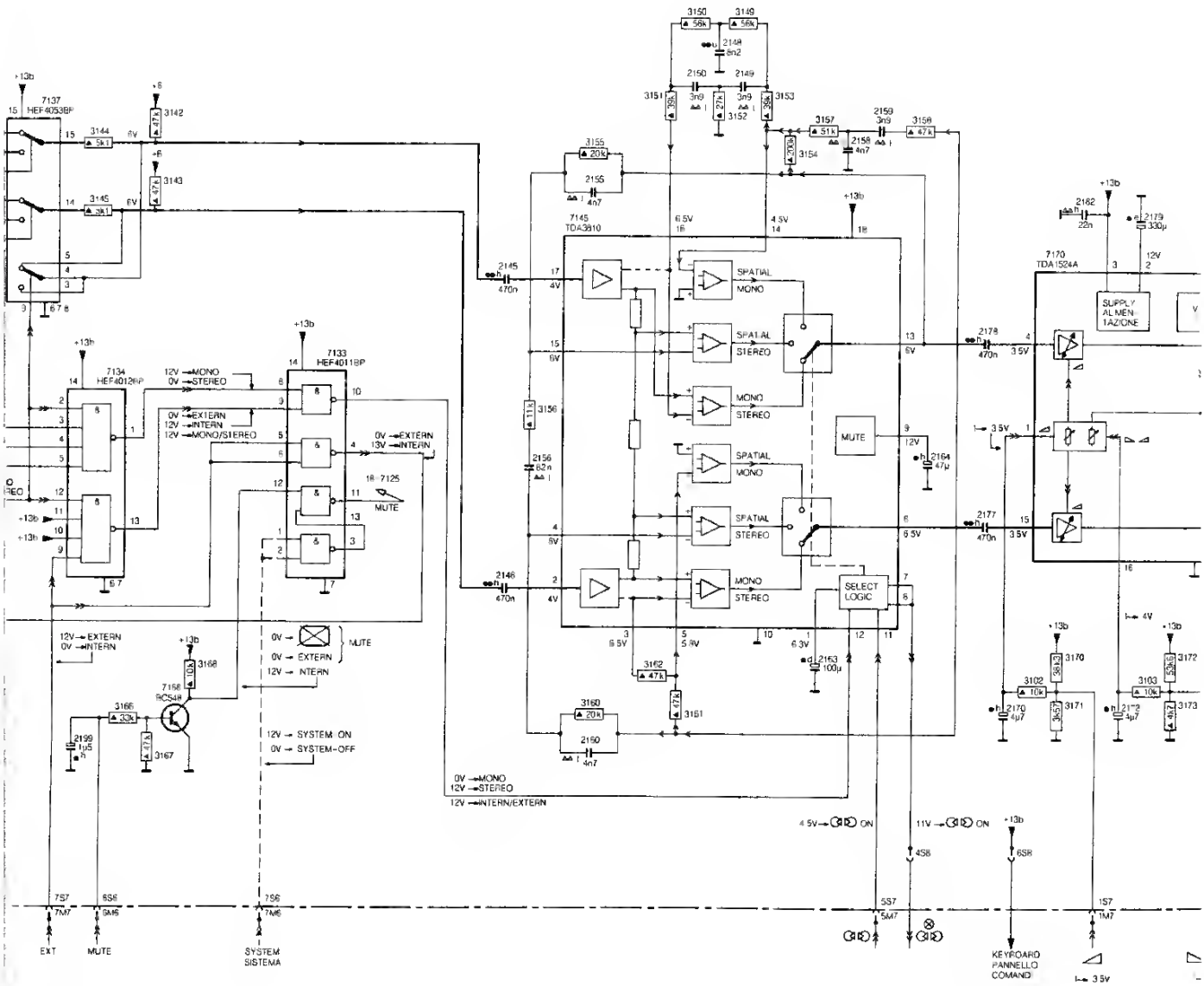

5100	4822 157 52508	3111	4822 100 20149	2.2	kΩ	potm	2111	4822 121 50566	1	nF	250 V
5101	4822 157 52509	3114	4822 116 53161	7.5	kΩ	0,4 W	2111	5322 121 54072	820	pF	250 V
5102	4822 157 52511	3115	4822 116 53161	7 5	kΩ	0,4 W	2111	4822 121 50427	750	pF	250 V
5103	4822 157 50964	3124	4822 116 53361	1 37	kΩ	0,4 W	2114	4822 121 50538	6 8	nF	63 V
5106	4822 157 52508	3129	4822 116 52838	100	kΩ	1,6 W	2115	4822 121 50538	6.8	nF	63 V
5107	4822 157 52509	3130	4822 116 53359	619	kΩ	0,4 W	2117	4822 121 50566	1	nF	250 V
5108	4822 157 52511	3131	4822 118 52838	100	kΩ	1,6 W	2117	5322 121 54072	820	pF	250 V
5134	4822 157 52512	3133	4822 116 53359	619	kΩ	0,4 W	2117	4822 121 50427	750	pF	250 V
		3134	4822 116 52781	249	Ω	0,4 W	2125	4822 121 42477	47	nF	50 V
		3170	4822 116 53364	38 3	kΩ		2141	5322 121 54072	820	pF	250 V
		3171	4822 116 53363	3 57	kΩ						
		3172	4822 118 53202	53 6	kΩ	0,6 W					

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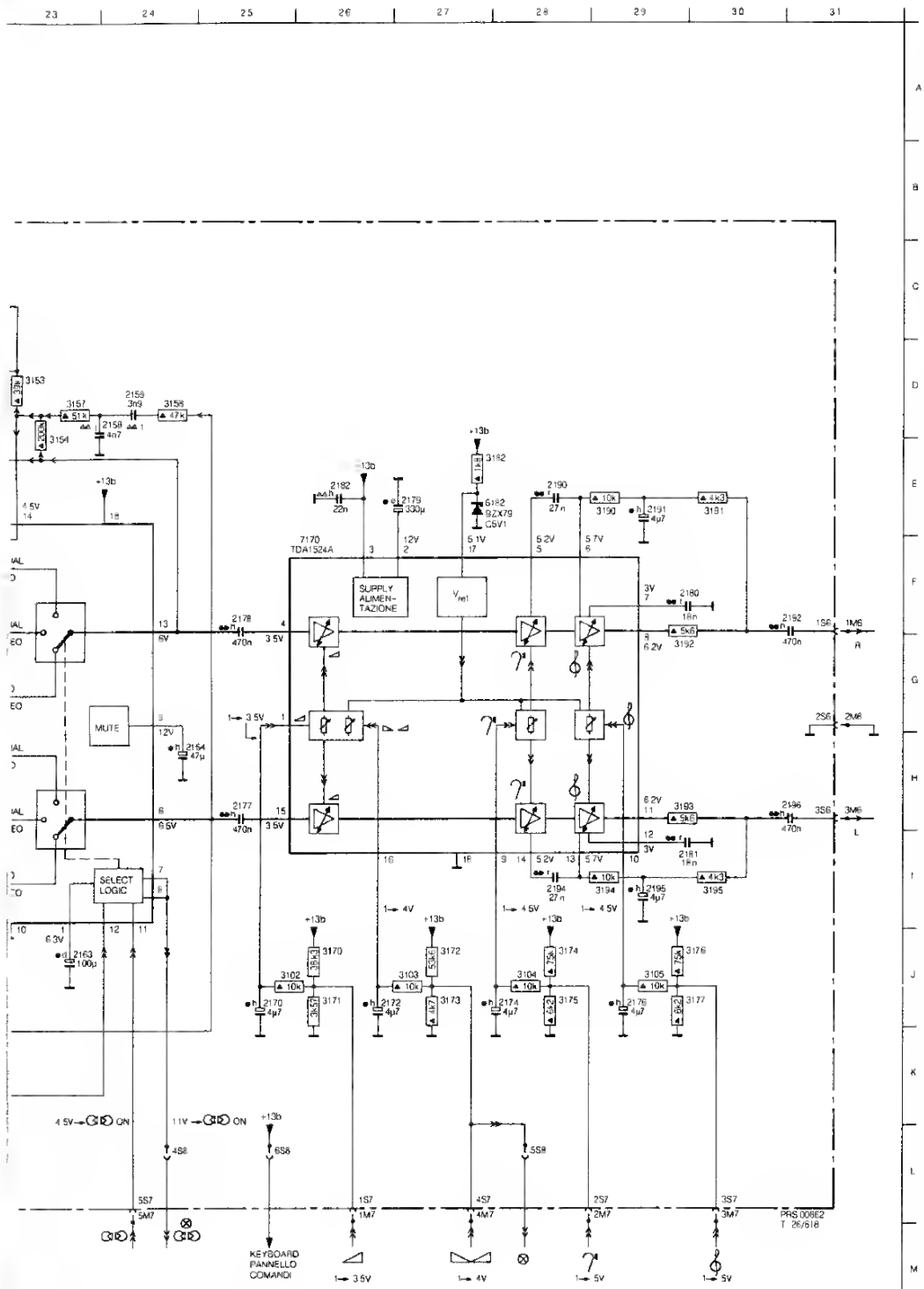

2111	4822 121 50566	1	nF	250 V
2111	5322 121 54072	820	pF	250 V
2111	4822 121 50427	750	pF	250 V
2114	4822 121 50538	6.8	nF	63 V
2115	4822 121 50538	6.8	nF	63 V
2117	4822 121 50566	1	nF	250 V
2117	5322 121 54072	820	pF	250 V
2117	4822 121 50427	750	pF	250 V
2125	4822 121 42477	47	nF	50 V
2141	5322 121 54072	820	pF	250 V

S5	4822 265 40503	5p
S6	4822 265 40472	10p
S7	4822 265 40471	8p

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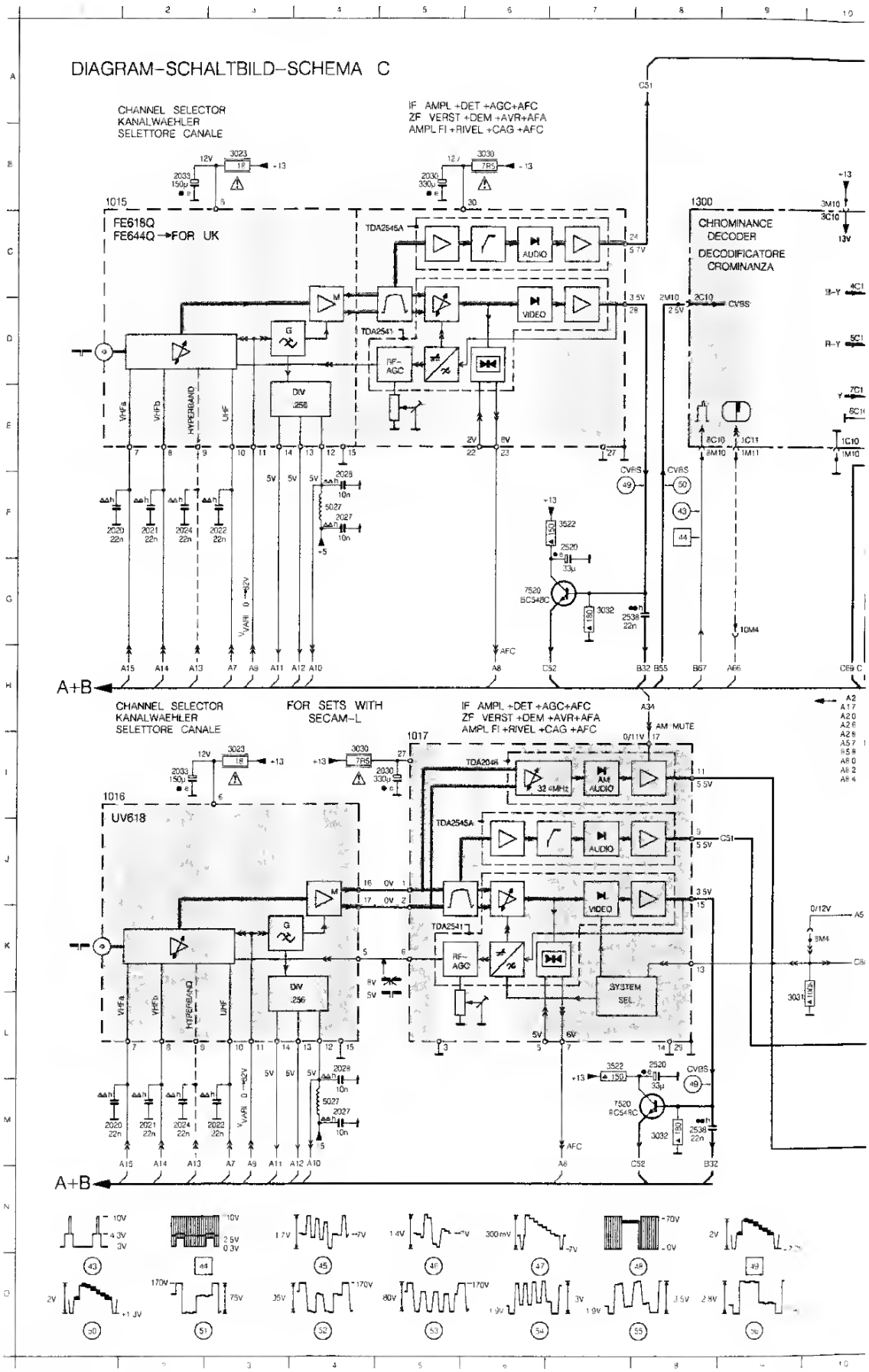

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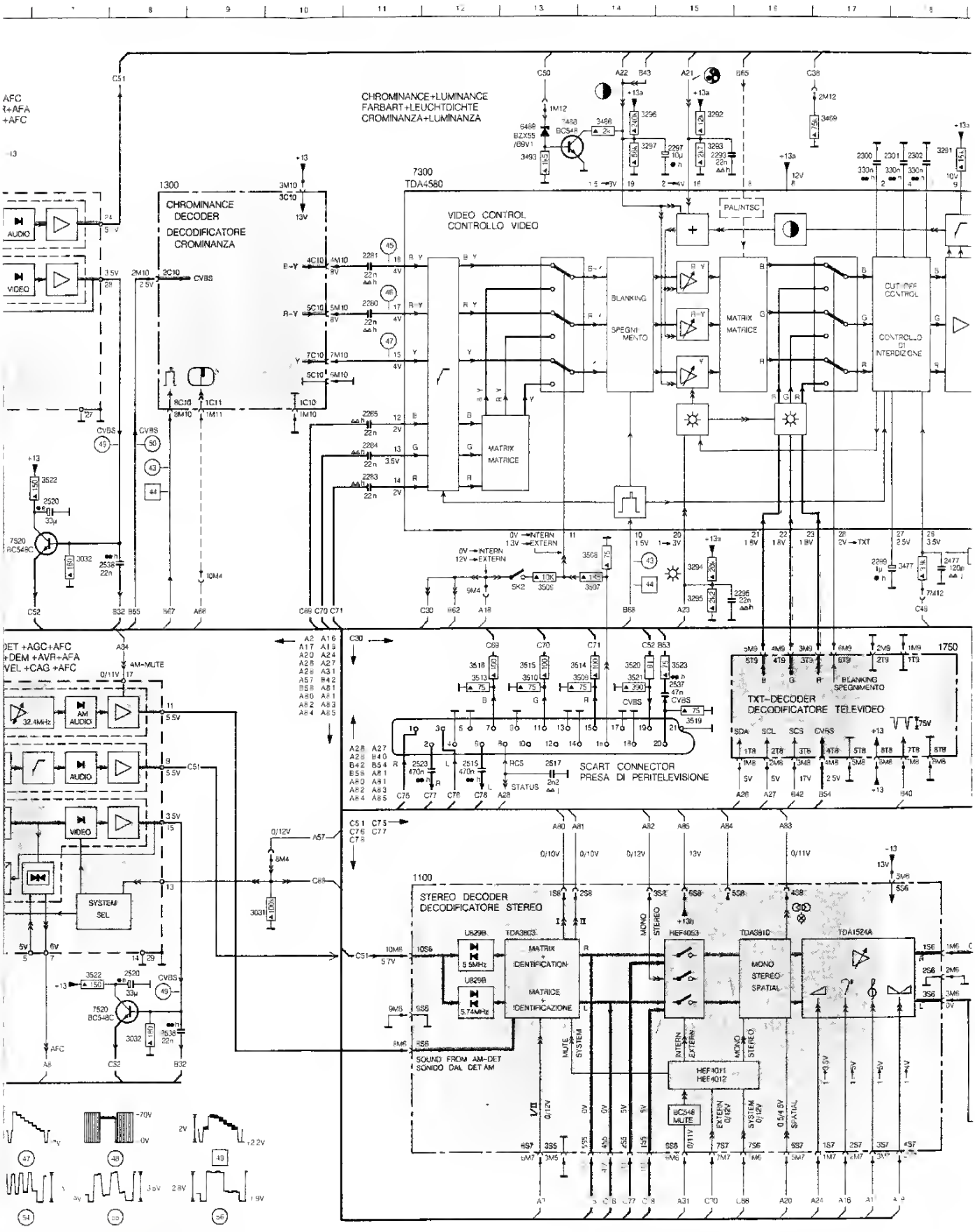

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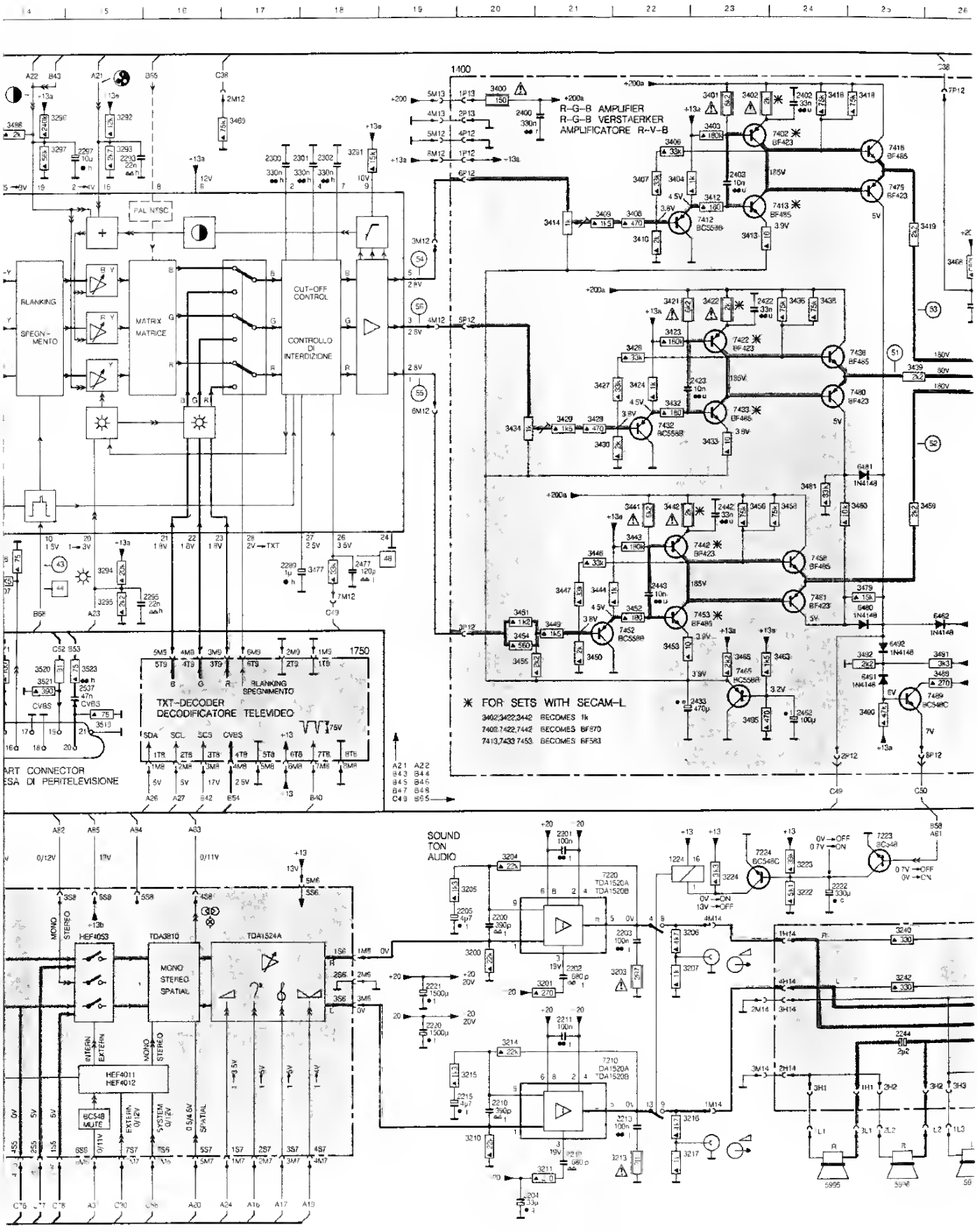

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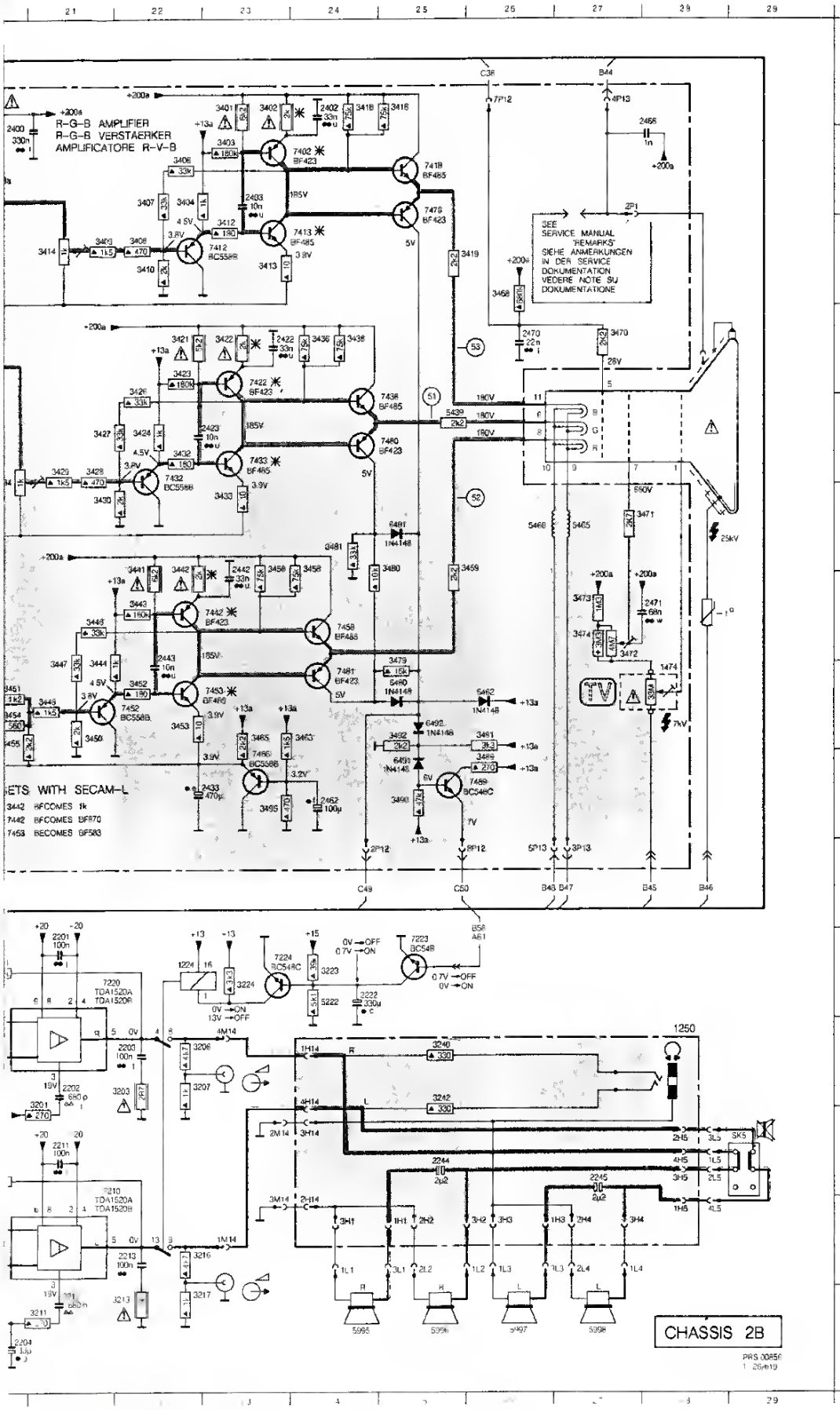

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1300	B 8	3465	H25
2020	F 1	3466	C26
2020	M 1	3469	B17
2021	F 2	3470	D27
2021	M 2	3471	F28
2022	F 3	3472	G27
2022	M 3	3473	G27
2024	F 2	3474	G27
2024	M 2	3477	G18
2027	F 4	3479	G25
2027	M 4	3480	F25
2028	F 4	3481	F24
2028	L 4	3488	B14
2030	B 5	3489	I 28
2030	5	3490	I 25
2033	B 2	3491	H26
2033	I 2	3492	H25
2200	L20	3493	B13
2201	K21	3495	I 23
2202	L21	3506	G13
2205	L22	3507	G14
2204	O20	5508	G14
2205	L20	3509	I 14
2210	N20	3510	I 13
2211	M21	3515	I 12
2212	O21	3514	H14
2213	N22	3515	H13
2215	N20	3516	H12
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2221	L19	3520	H14
2222	K24	3521	I 14
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2245	M27	3522	L 7
2280	D11	5523	H15
2281	C11	5027	F 4
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2297	B15	5998	O27
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2403	B23	6492	H25
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2423	E25	7220	K22
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2462	I 24	7402	B24
2466	A25	7412	C23
2470	D26	7415	G24
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2515	J12	7432	E22
2517	J15	7435	E23
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2520	L 9	7442	G23
2523	J12	7452	H22
2537	I 15	7453	H23
2538	G 8	7458	G24
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3023	I 5	7480	E25
3030	B 6	7481	H24
3030	I 4	7488	B13
3031	L 8	7489	I 26
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3032	M 8	7520	M 7
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3201	L21		
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3291	B18		
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3293	B15		
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3295	H15		
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3453	H22		
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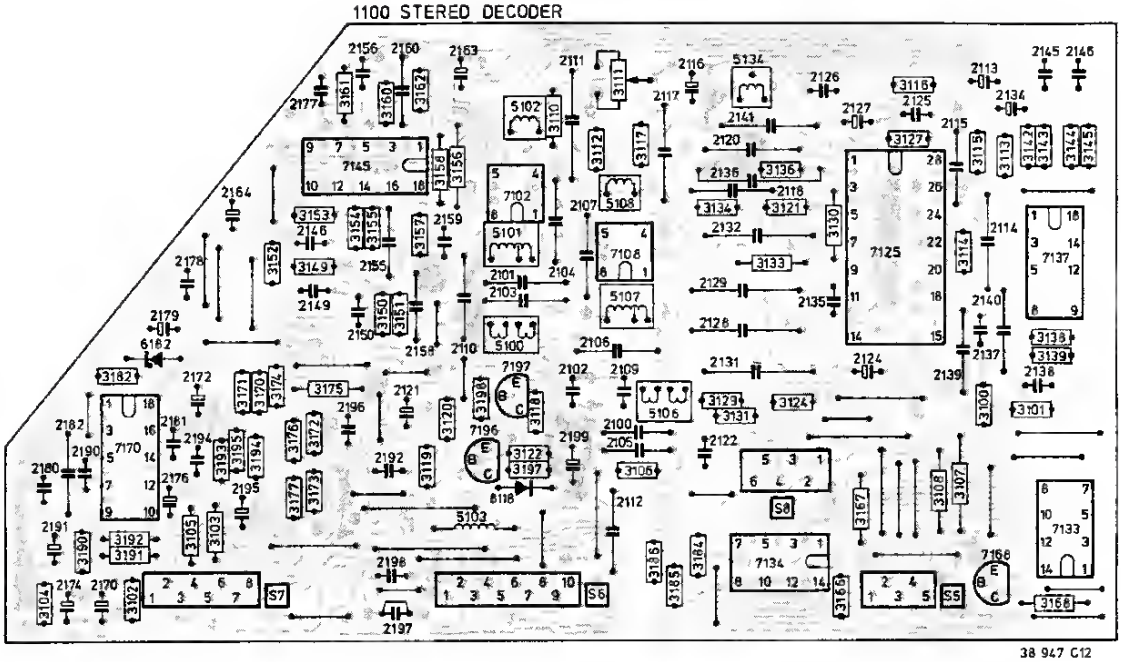
1100 STEREO DECODER



38 947 C12

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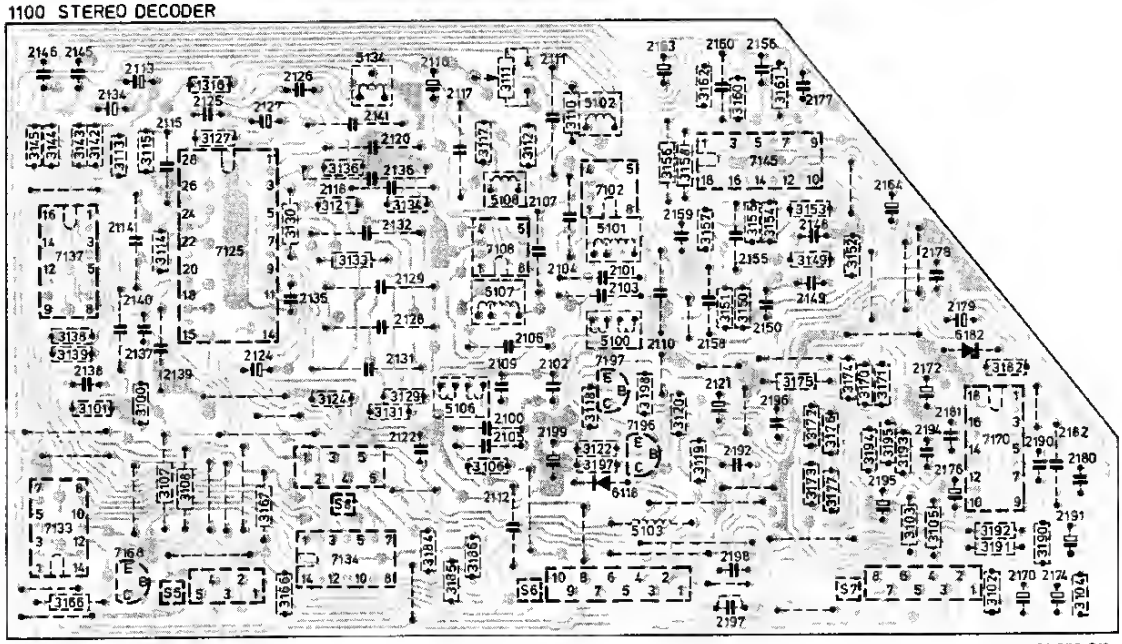

38 953 C12

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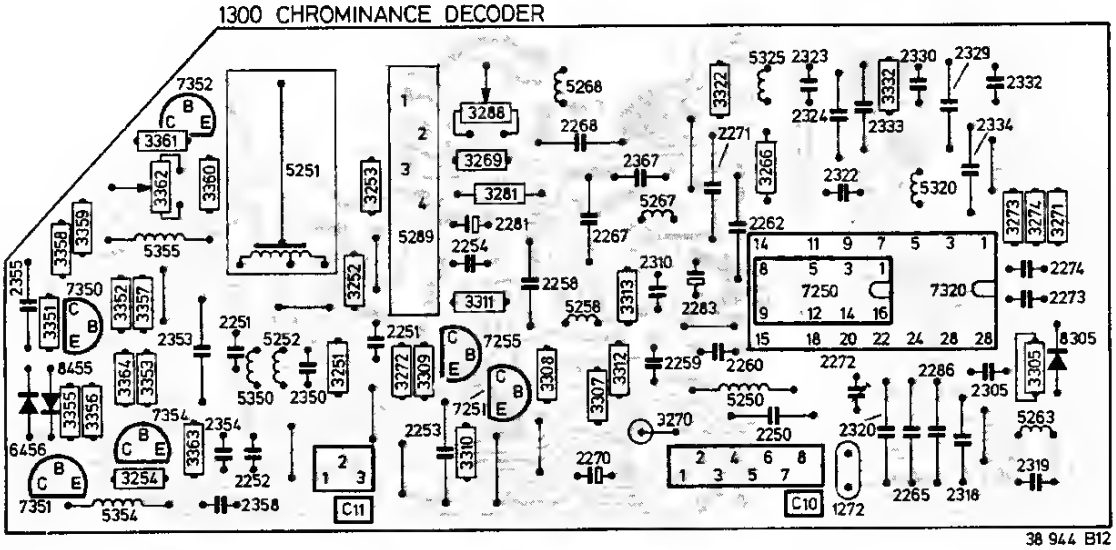
1300 CHROMINANCE DECODER



38 944 B12

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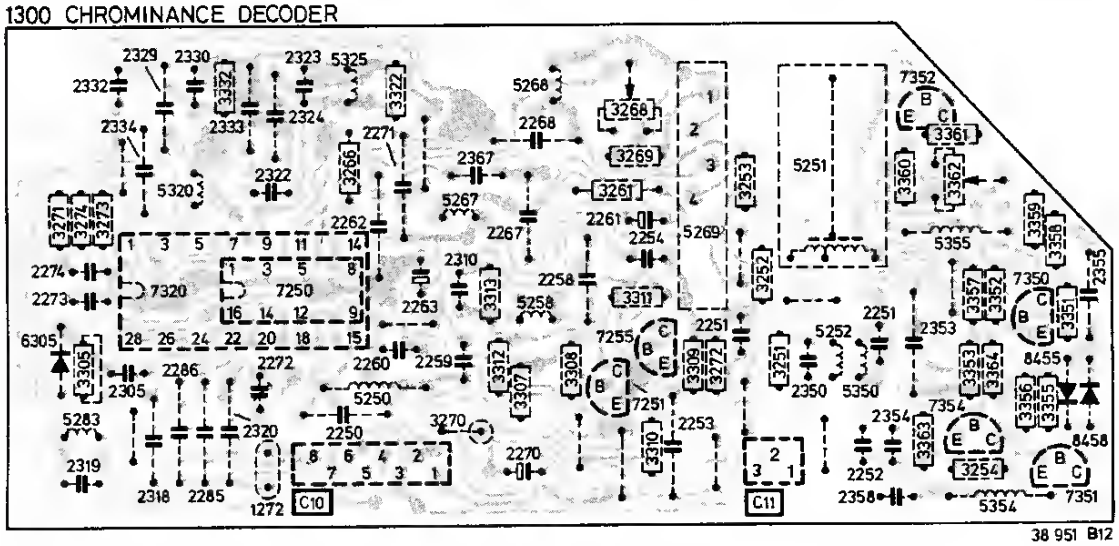

38 951 B12

PAL CHROMINANCE DECODER 1300

TDA4510	4822 209 70019		3268	4822 100 10995	220 Ω potm
			3270	4822 111 30515	18 Ω 0,33 W
BC548	4822 130 40938		3362	4822 100 20168	1 kΩ potm
BC558	4822 130 40941				
			2272	4822 125 50045	20 pF trimm.
BA317	4822 130 30847		**Various**		
			1272	4822 242 70626	Crystal
5250	4822 157 50961				
5251	4822 157 51056		C10	4822 265 40471	8p
5251	4822 320 40141	(crispening)	C11	4822 265 30431	3p
5252	4822 156 21146				
5258	4822 157 52507				
5267	4822 157 52507				
5268	4822 157 52507				
5269	4822 320 40096				
5350	4822 156 21025				
5354	4822 157 51577				
5355	4822 156 21334				

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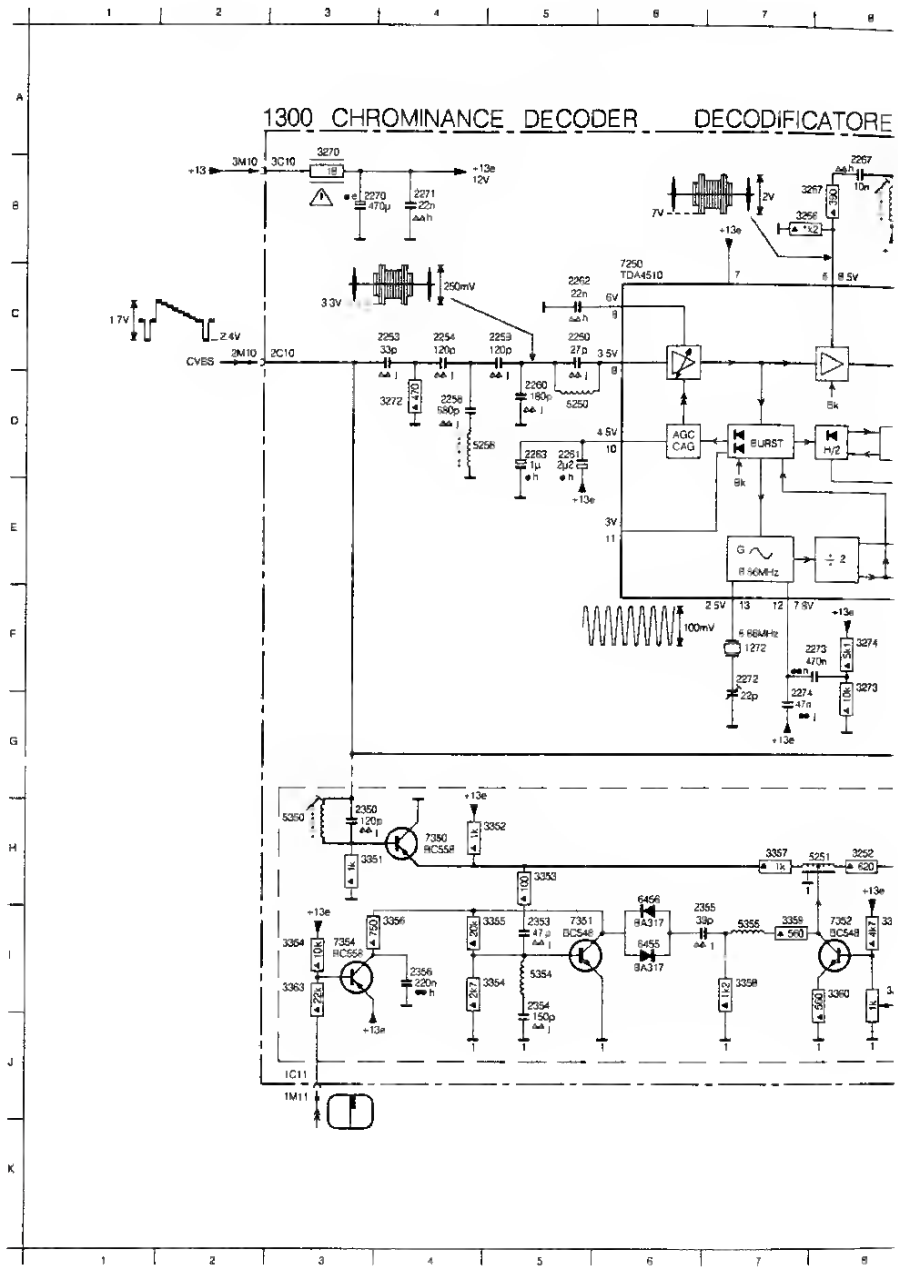

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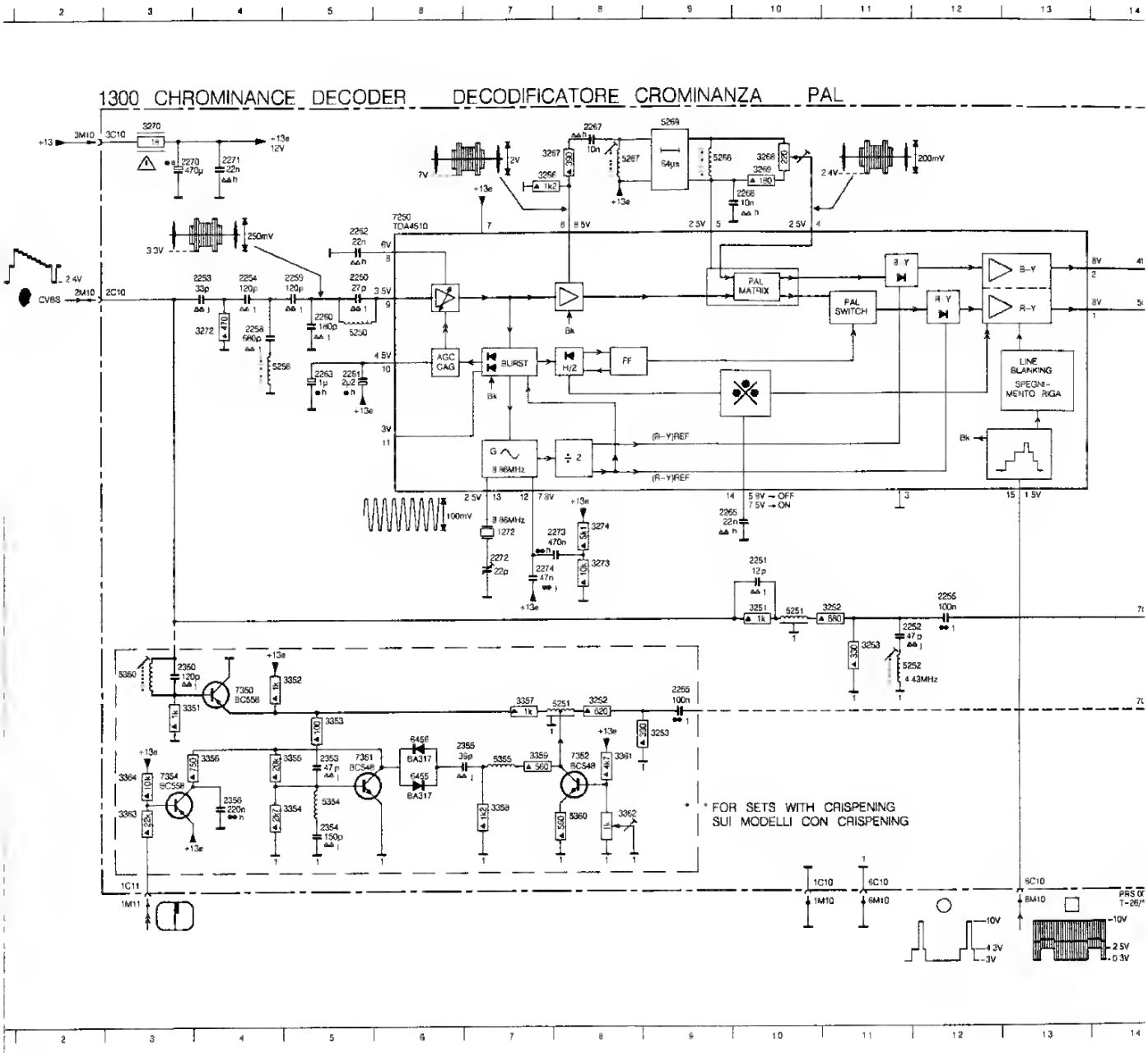

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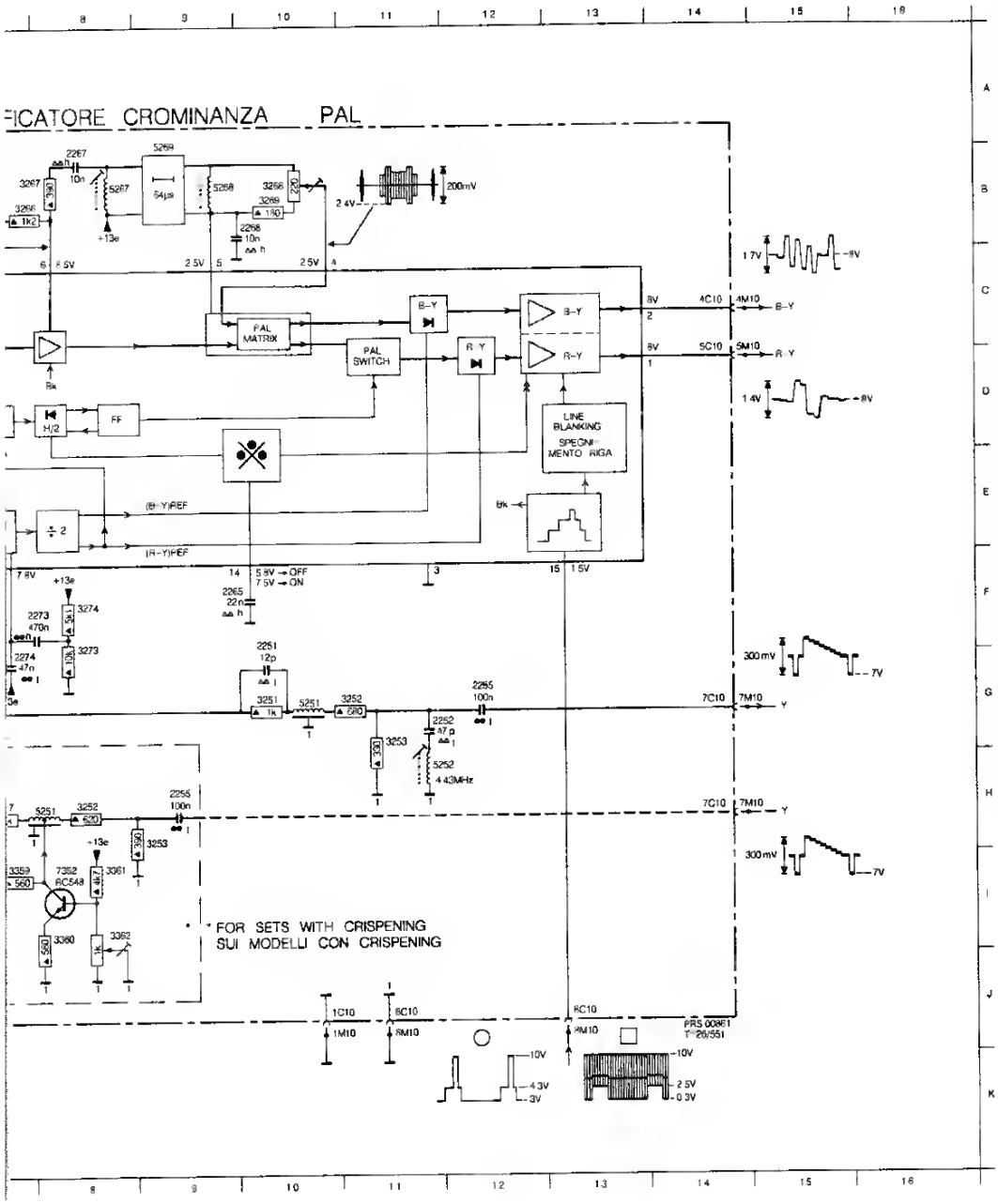

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2268	B10
2270	B 4
2271	B 4
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2354	I 5
2355	I 7
2356	I 4
3251	G10
3252	H 8
3252	G11
3253	H 9
3253	G11
3256	B 7
3257	B 8
3258	B10
3259	B10
3270	A 3
3272	D 4
3273	F 8
3274	F 8
3351	H 4
3352	H 5
3353	H 5
3354	I 5
3355	I 5
3356	I 4
3357	H 7
3358	I 7
3359	I 7
3360	I 8
3361	I 8
3362	I 8
3363	I 3
3364	I 3
5250	D 5
5251	H 8
5251	G10
5252	H12
5258	D 5
5267	B 8
5268	B 9
5269	A 3
5360	H 3
5354	I 5
5355	I 7
6455	I 6
8458	H 6
7250	C 6
7350	H 4
7351	I 5
7352	I 8
7354	I 3

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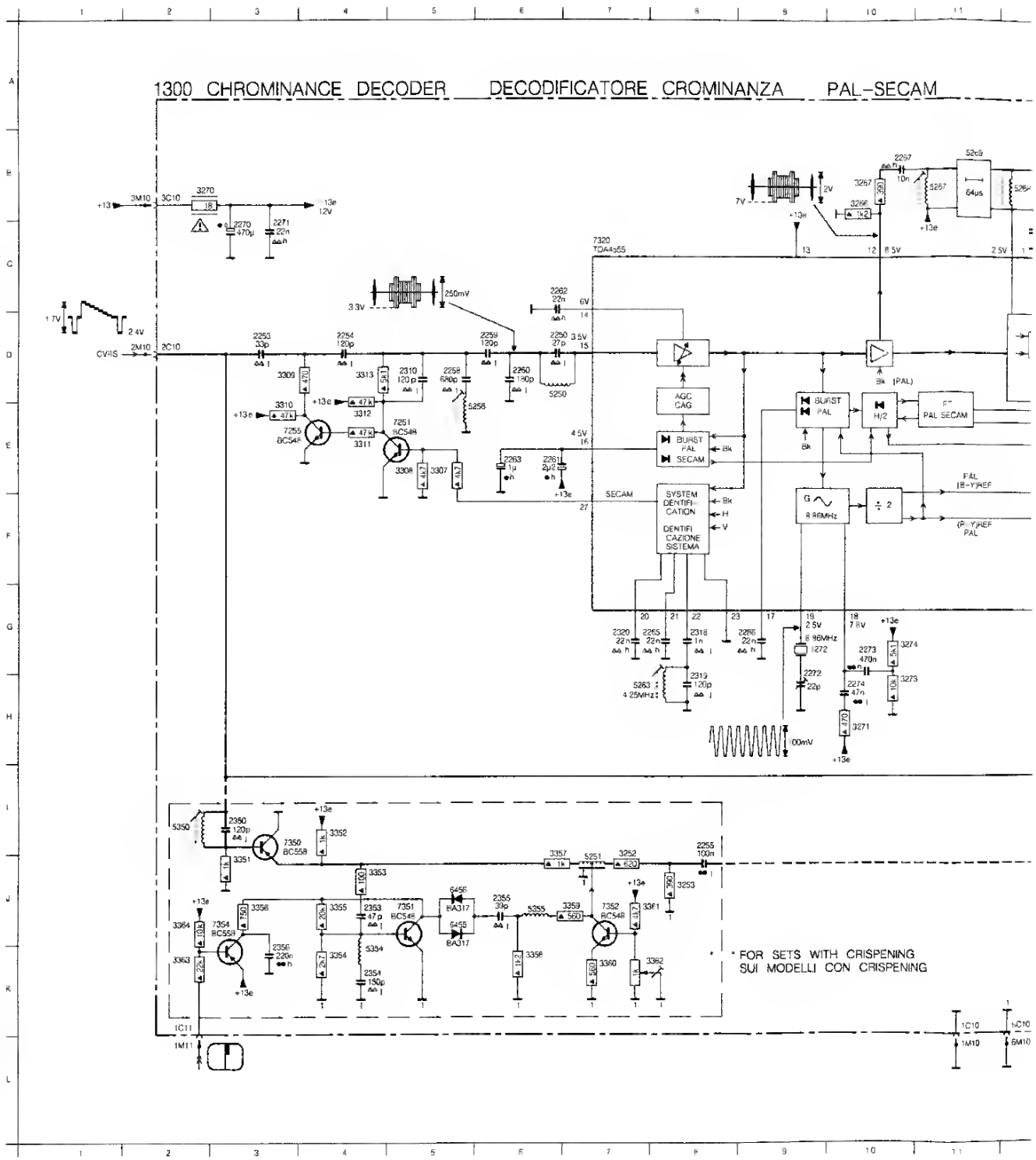

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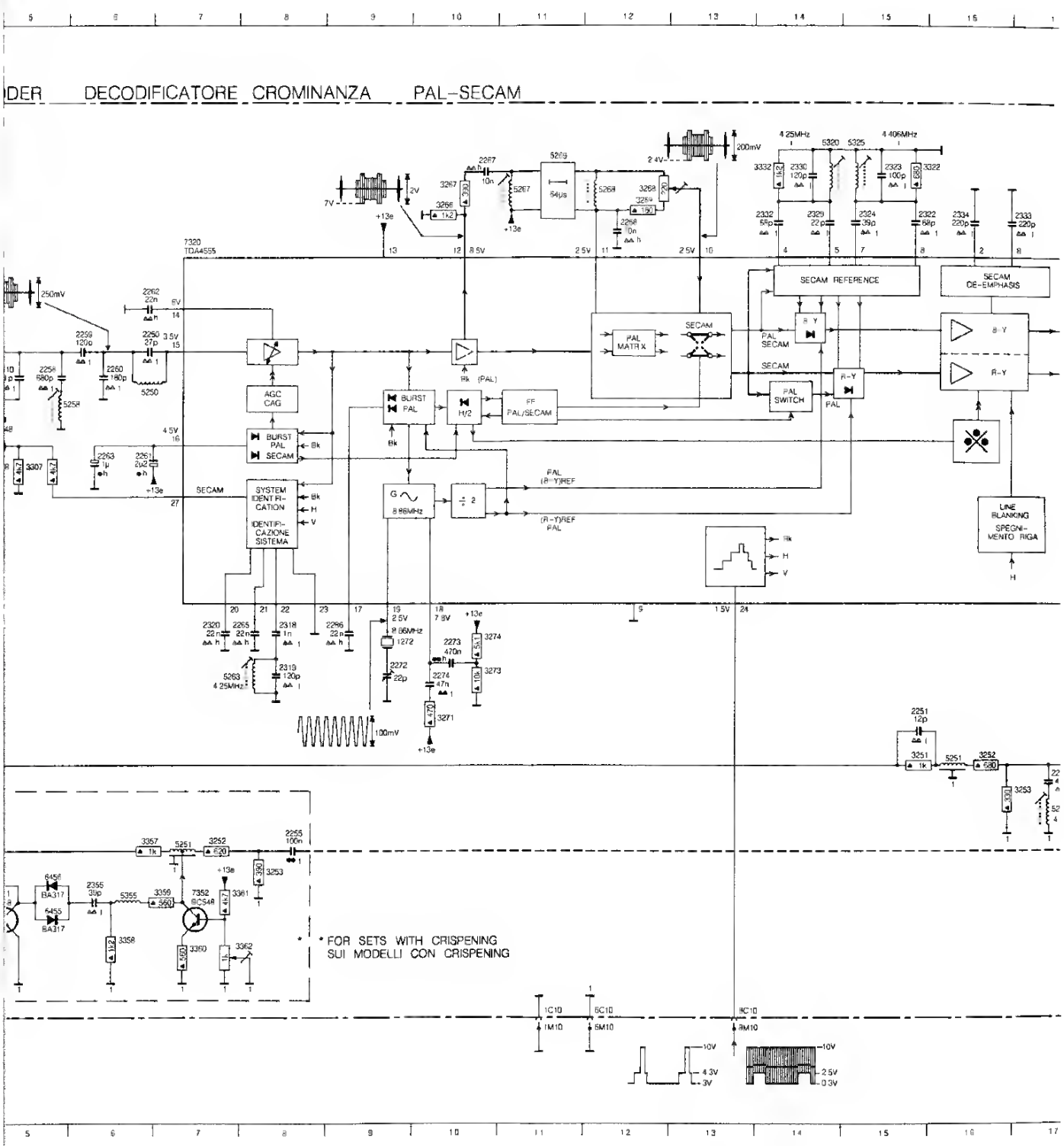

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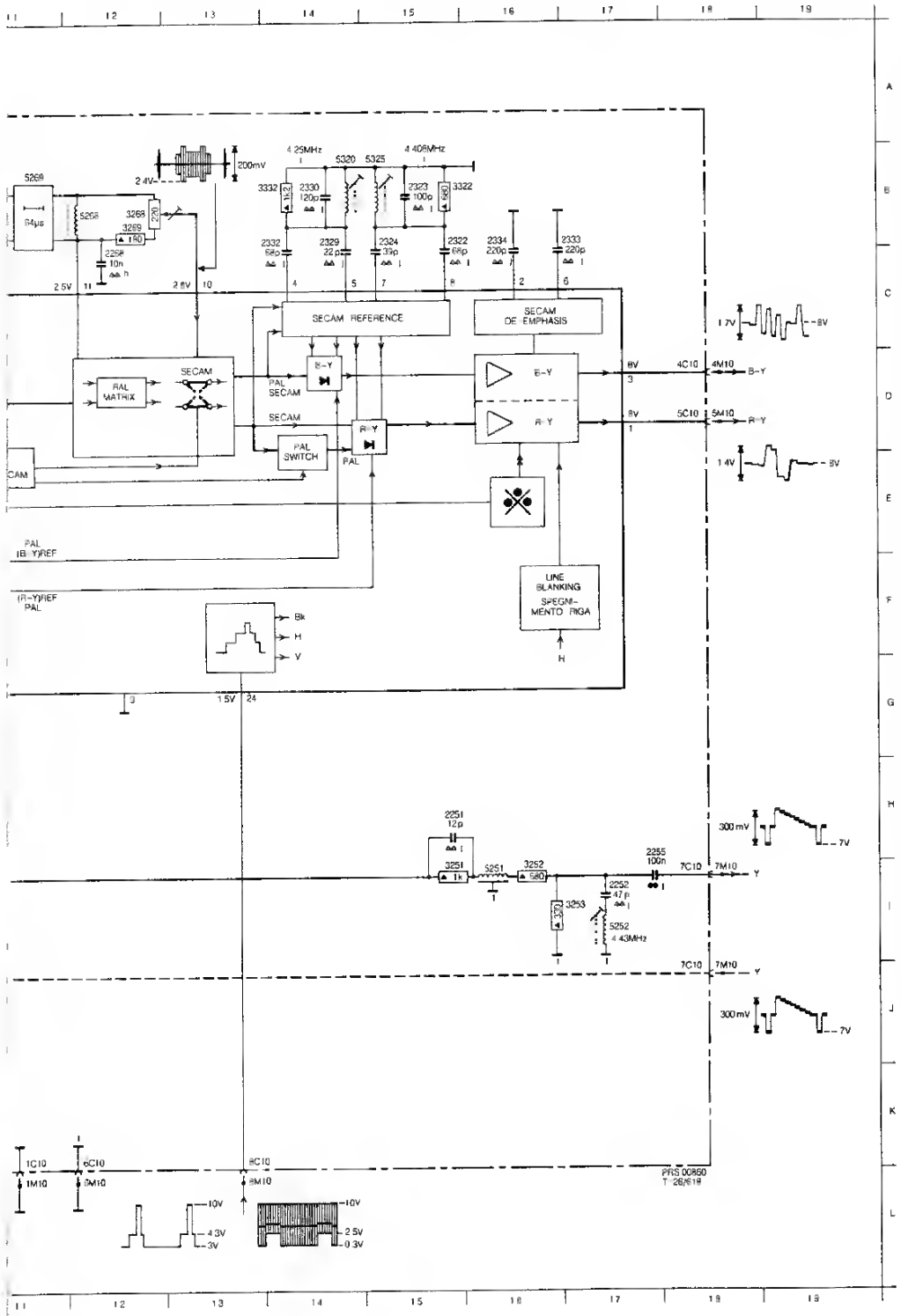

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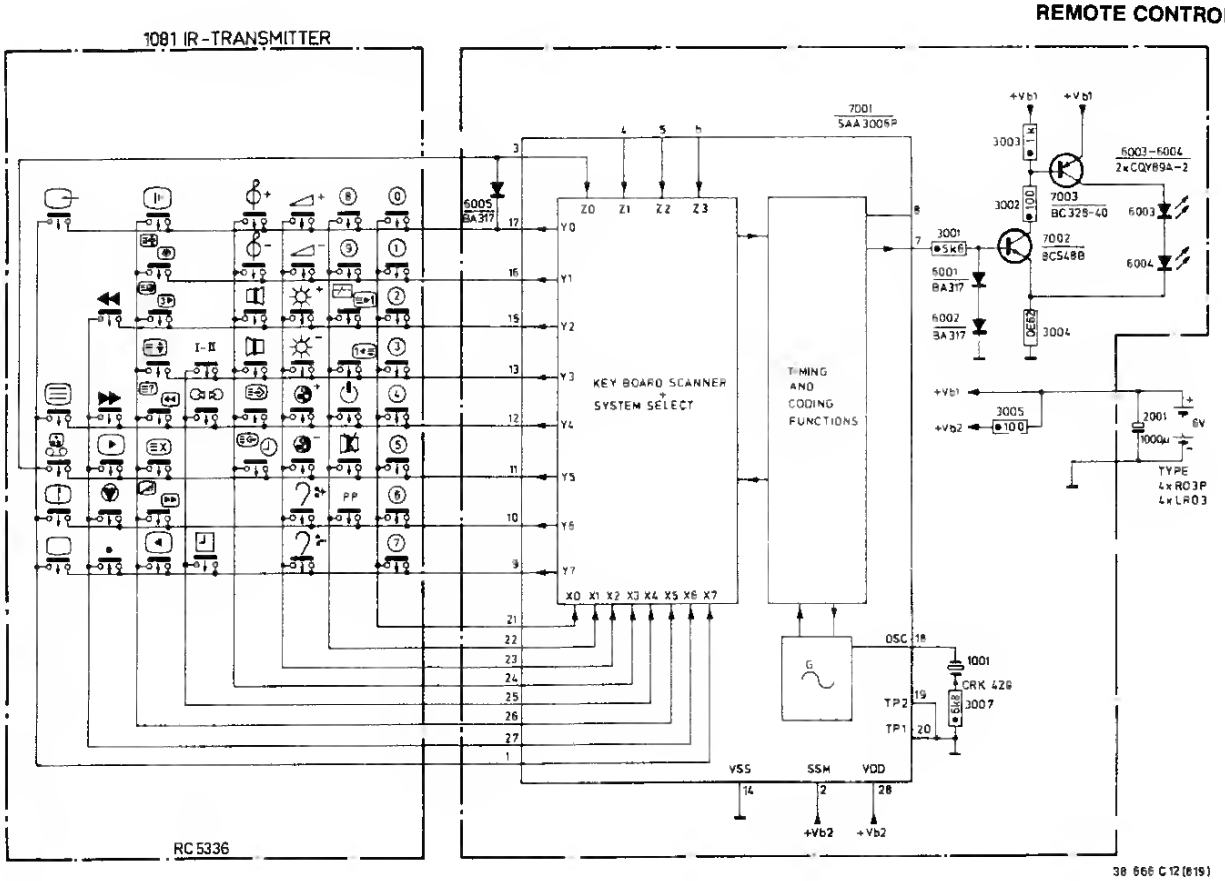

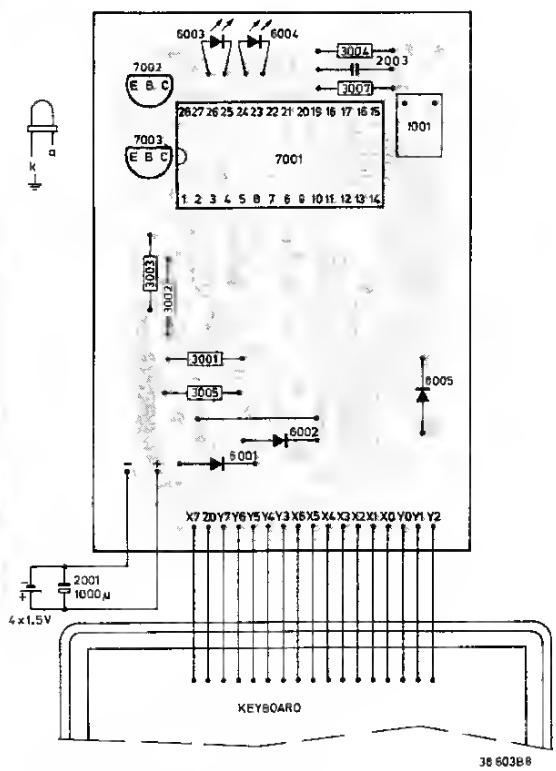

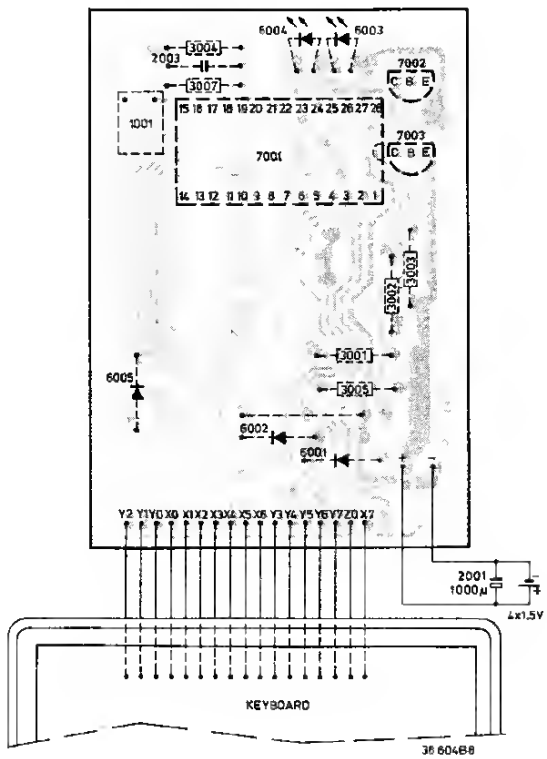

16
15
14
13

SAA3(
BC54E
BC32E
BA317
3004

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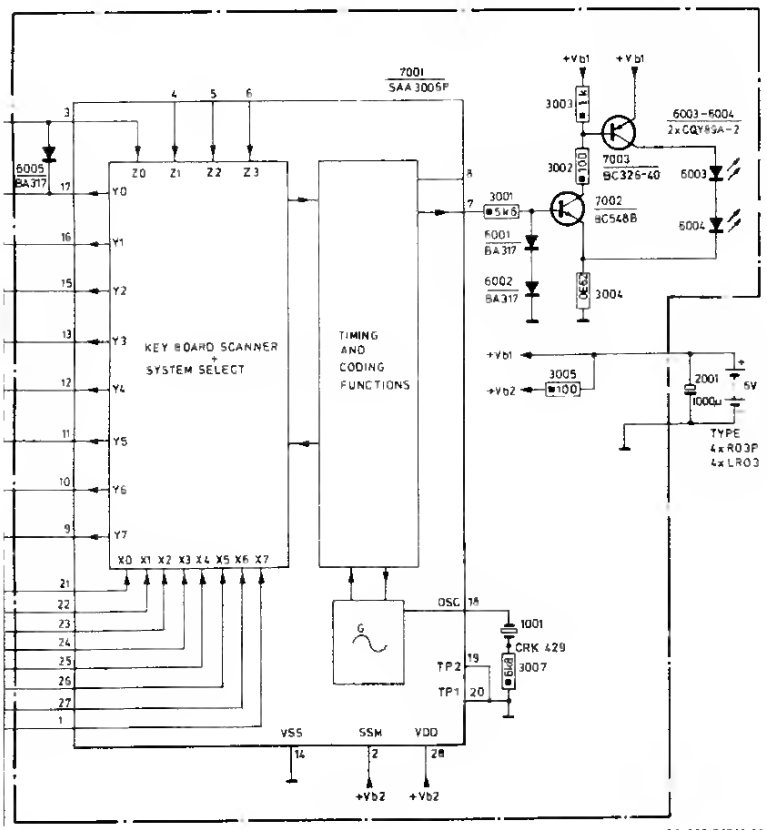
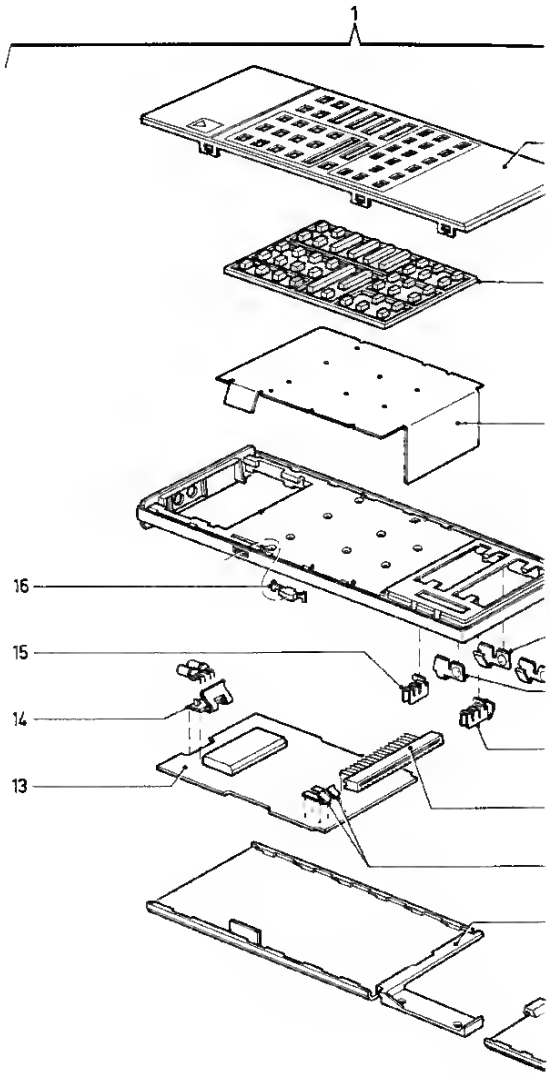
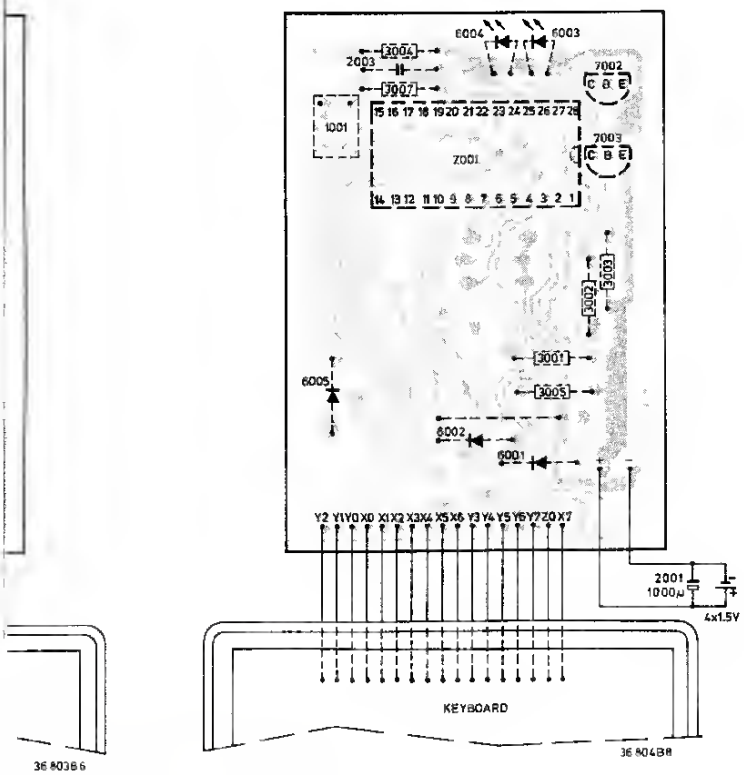
REMOTE CONTROL TRANSMITTER RC5336







SAA3006P	4822 209 81891	
BC548B BC328-40	4822 130 40937 4822 130 41715	
BA317	4822 130 30847	
3004	4822 111 70144	0,62Ω

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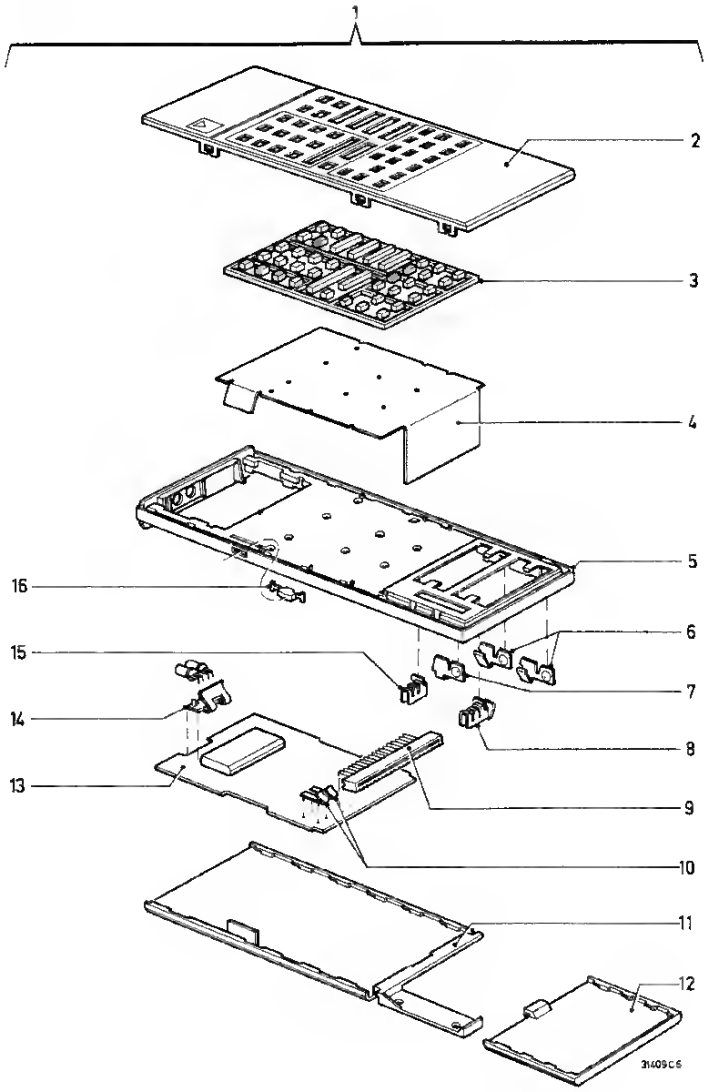
CONTROL TRANSMITTER RC5336



pos.	Service code
1	4822 218 20431
2	4822 432 30261
3	4822 410 24173
4	4822 218 20559
5	4822 432 30166
6	4822 492 62879
7	4822 492 62881
8	4822 492 62883
9	4822 267 50418
10	4822 492 62904
11	4822 432 30165
12	4822 432 30164
13	4822 212 21643
14	4822 256 90506
15	4822 492 62882
16	4822 410 23057

SAA3006P	4822 209 81891		
BC548B BC328-40	4822 130 40937 4822 130 41715		
BA317	4822 130 30847		
3004	4822 111 70144	0,62Ω	
CQY89A-2	4822 130 31332		
2001	4822 124 21341	1000 µF	8 V
Various			
1001	4822 242 71498		

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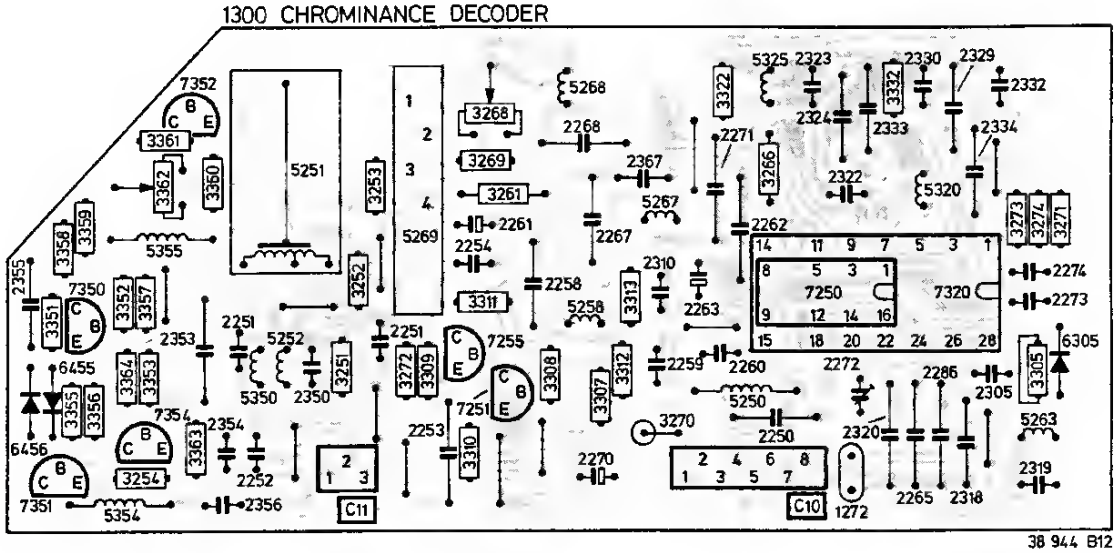
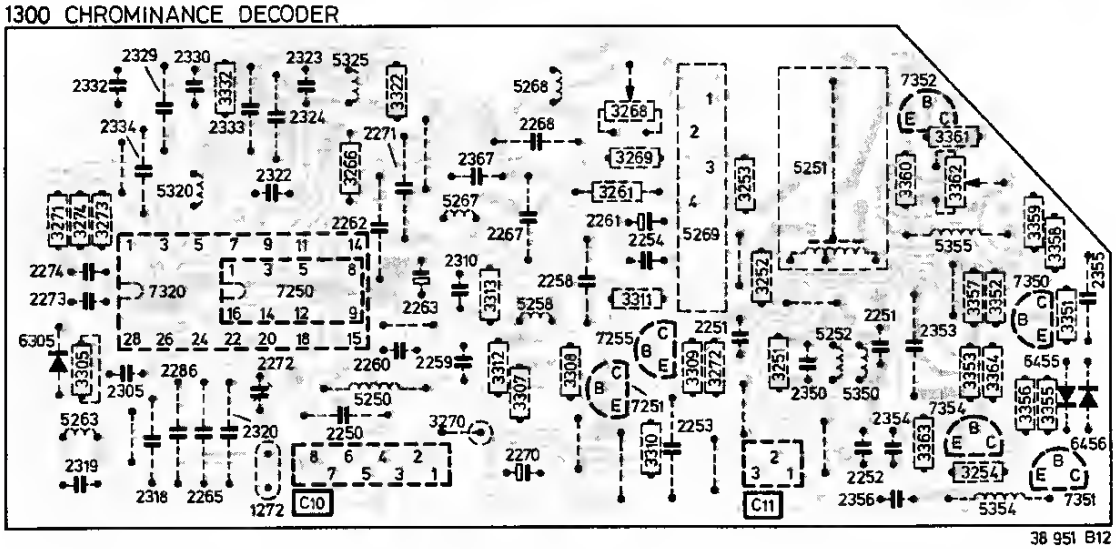
1300 CHROMINANCE DECODER



38 944 B12

1300 CHROMINANCE DECODER



38 951 B12

PAL/SECAM CHROMINANCE DECODER 1300

TDA4555	4822 209 83273		3268	4822 100 10995	220 Ω potm
			3270	4822 111 30508	10 Ω 0,33 W
BC548	4822 130 40938		3362	4822 100 20168	1 kΩ potm
BC558	4822 130 40941				
			2272	4822 125 50045	20 pF trimm
BA317	4822 130 30847				
1N4148	4822 130 31438		Various		
			1272	4822 242 70626	Crystal
5250	4822 157 50961				
5251	4822 157 51056		C10	4822 265 40471	8p
5251	4822 320 40141	(crispening)	C11	4822 265 30431	3p
5252	4822 156 21146				
5258	4822 157 52507				
5263	4822 156 21025				
5267	4822 157 52507				
5268	4822 157 52507				
5269	4822 320 40096				
5320	4822 156 21025				
5325	4822 156 21025				
5350	4822 156 21025				
5354	4822 157 51577				
5355	4822 156 21334				

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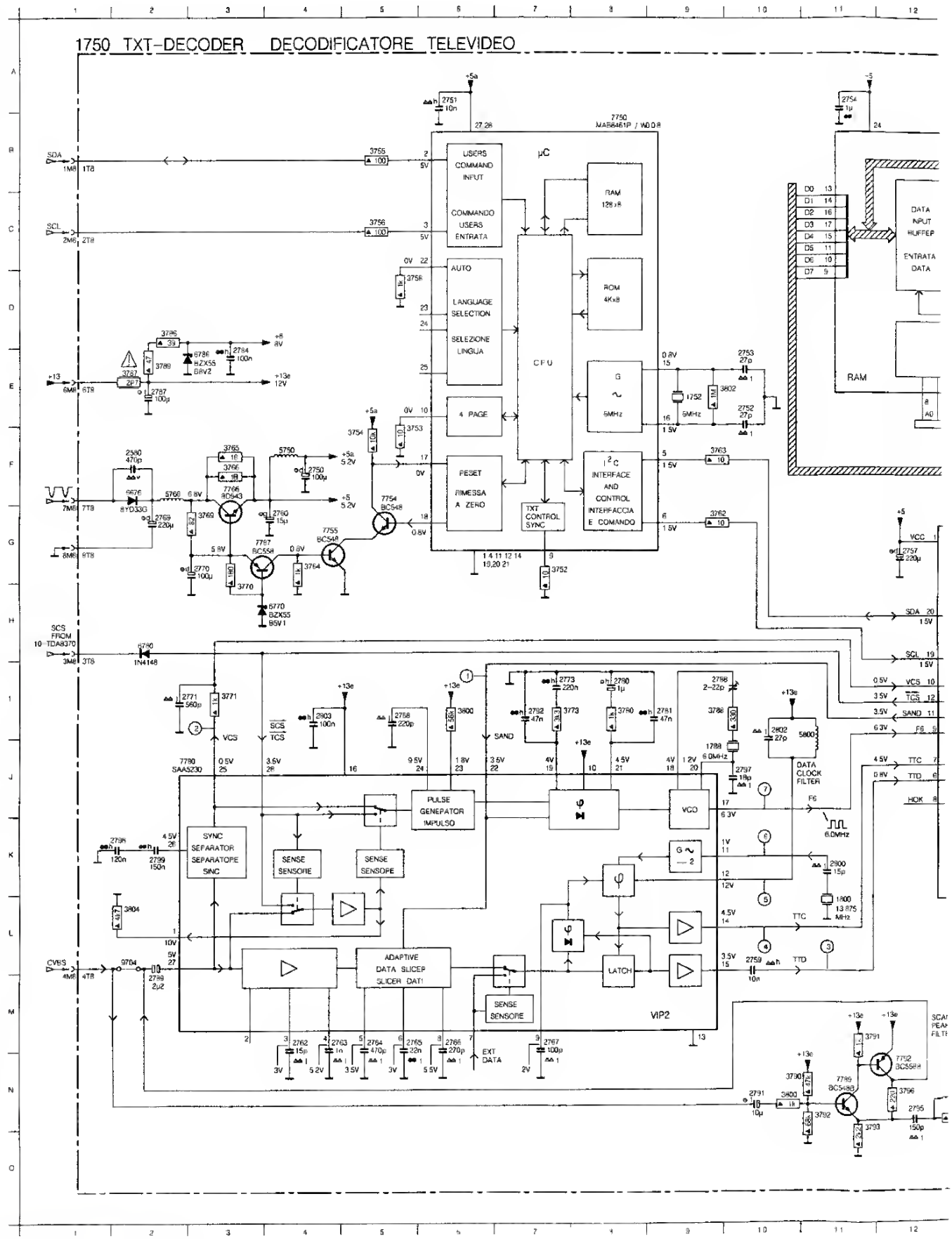

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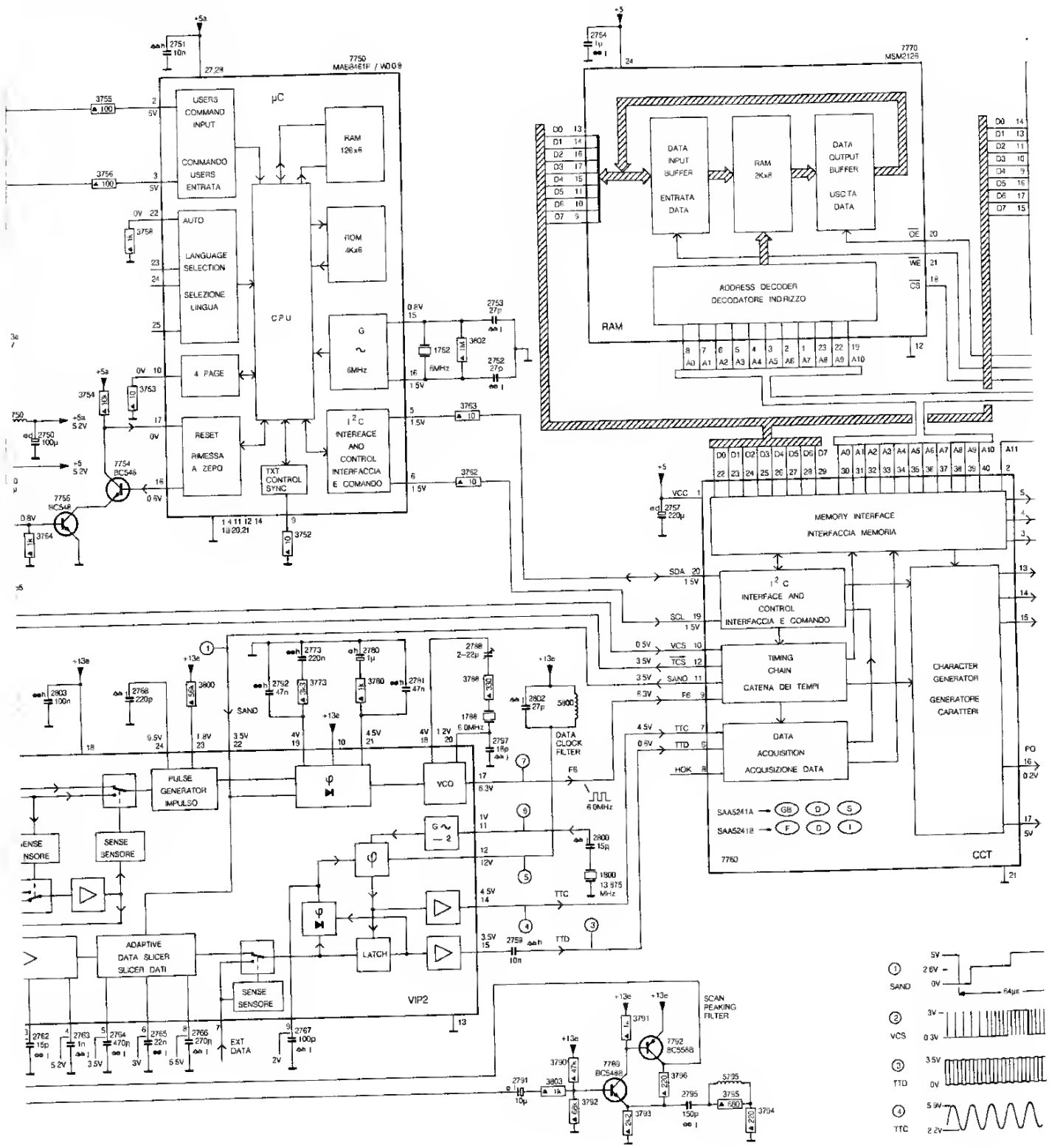
ECODIFICATORE TELEVIDEO



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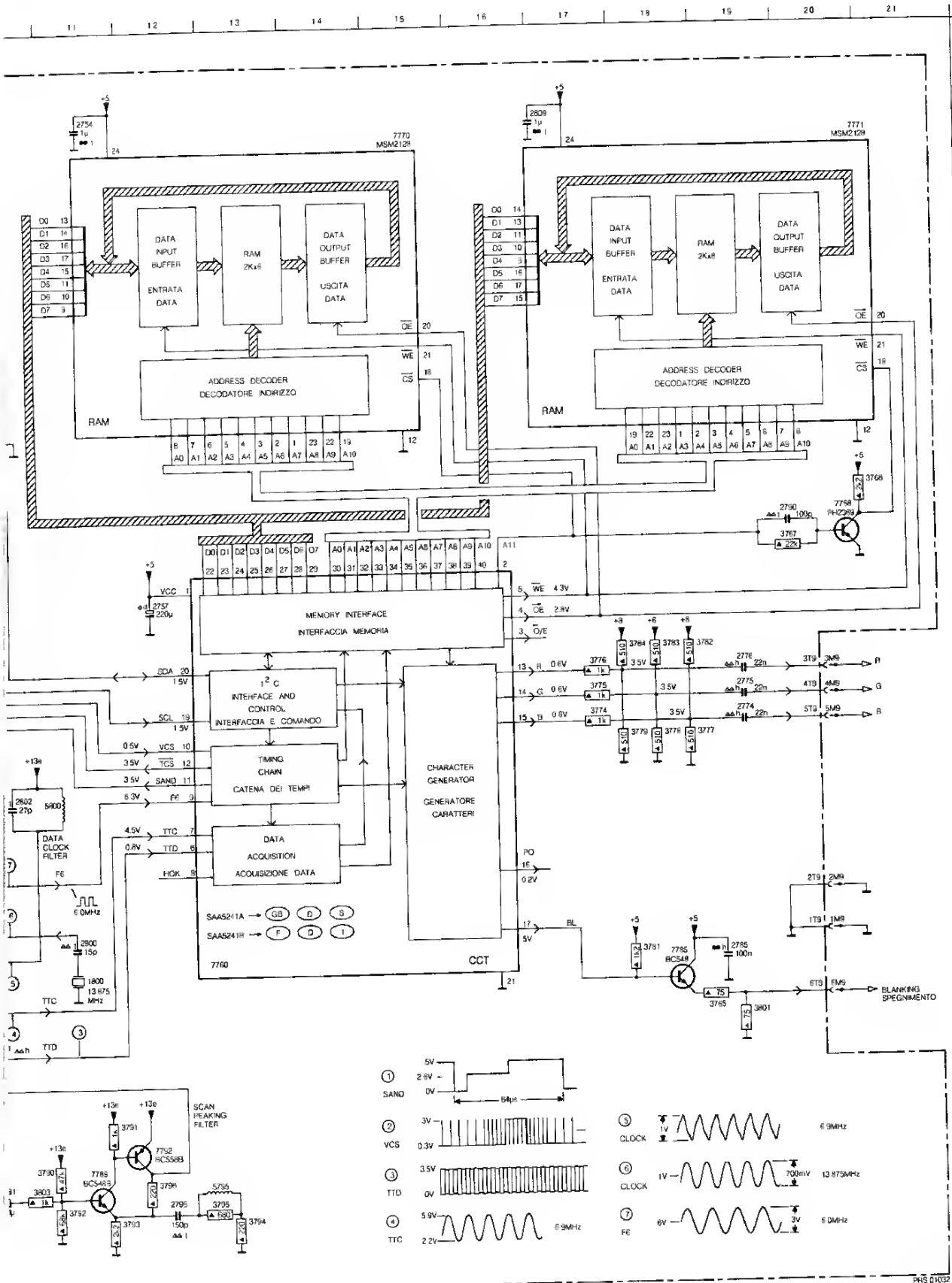

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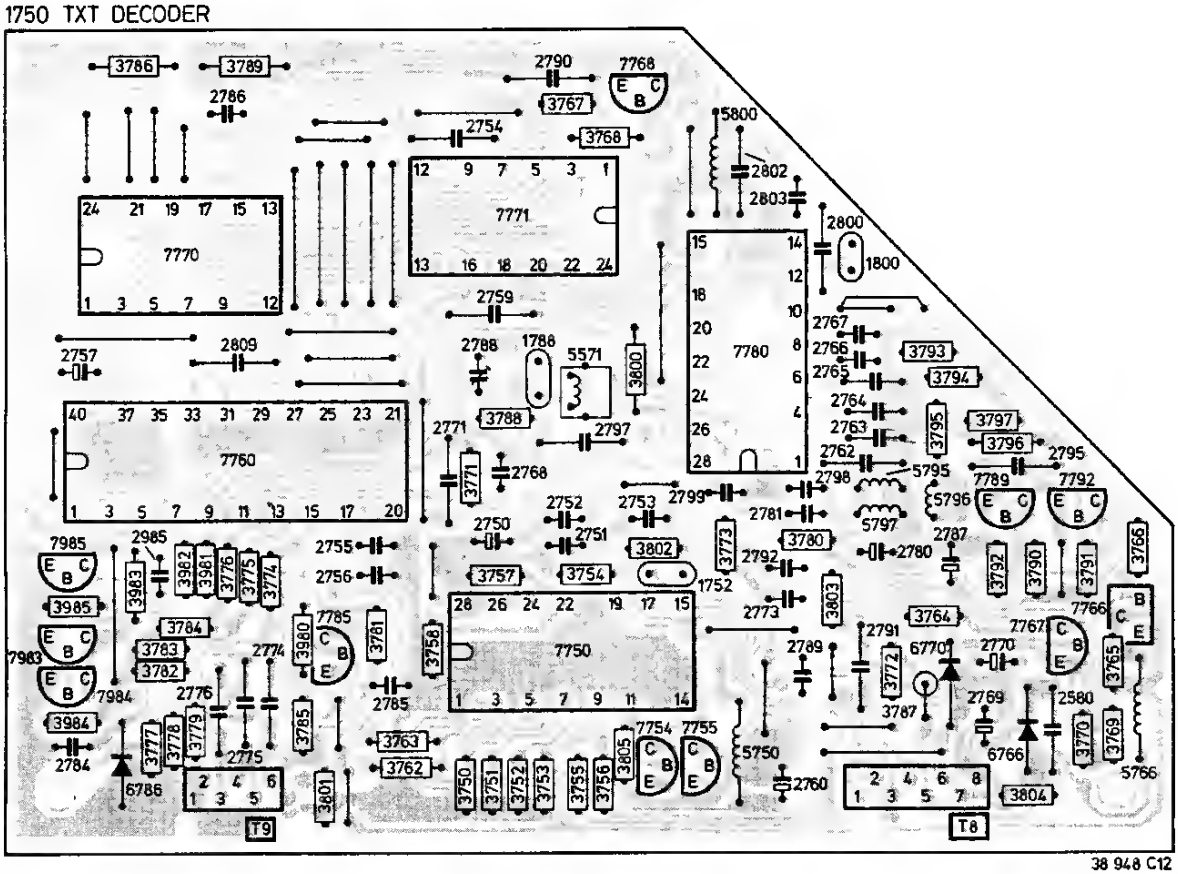
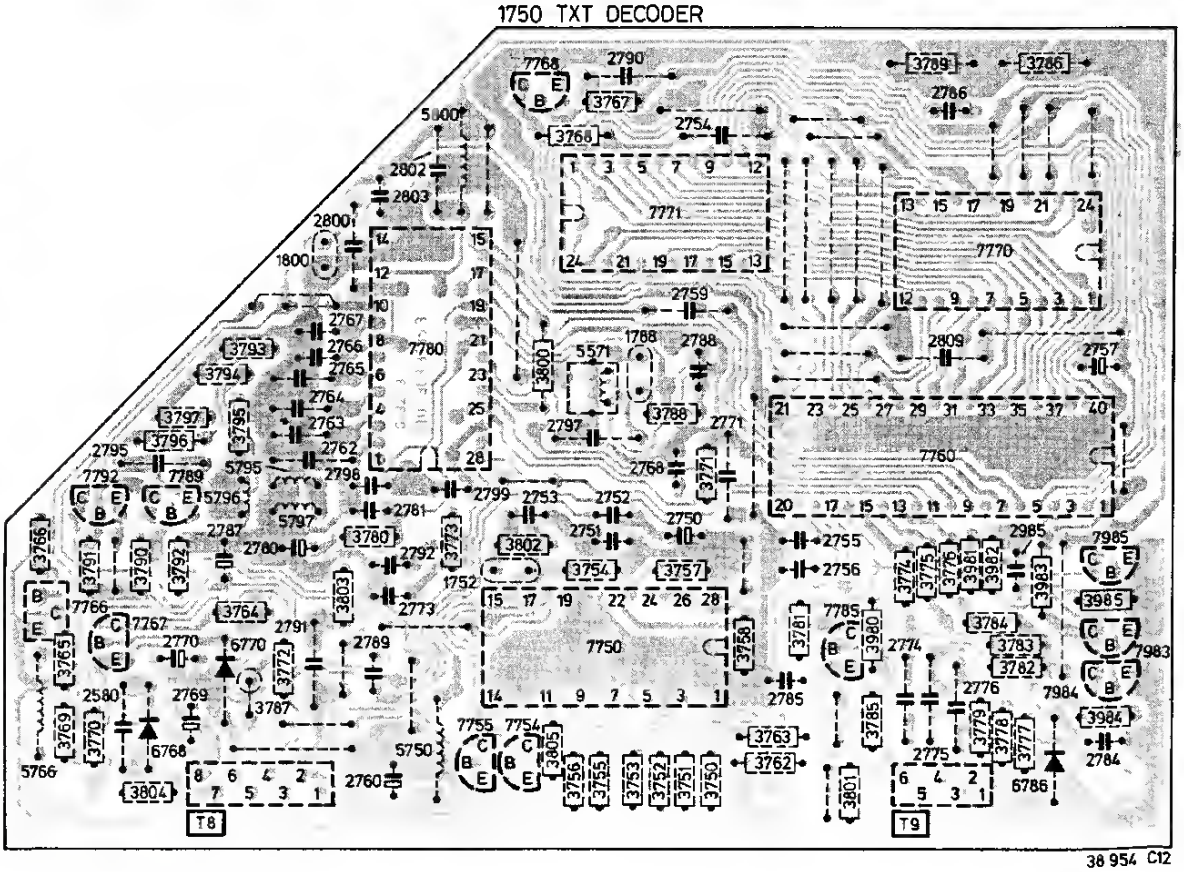
1750 TXT DECODER



38 948 C12

1750 TXT DECODER



38 954 C12

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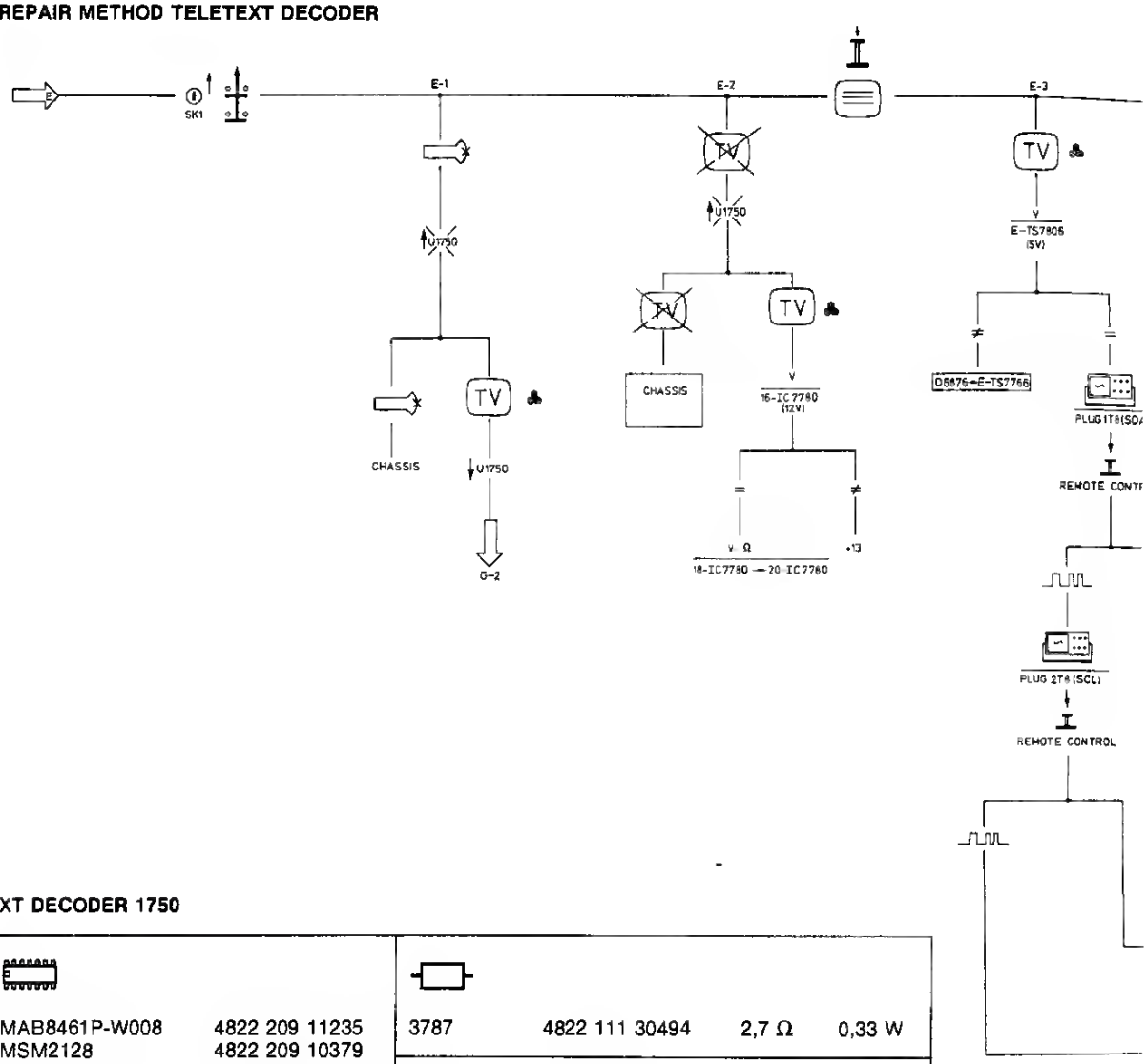
REPAIR METHOD TELETEXT DECODER



TXT DECODER 1750

MAB8461P-W008	4822 209 11235		
MSM2128	4822 209 10379		
SAA5230	4822 209 82786		
SAA5241A	4822 209 82819		
SAA5241B	4822 209 82785		
BC548	4822 130 40938		
BC548B	4822 130 40937		
BC558	4822 130 40941		
BC558B	4822 130 44197		
BD943	5322 130 44921		
PH2369	4822 130 41594		
BYD33G	4822 130 42489		
BZX55-B5V1	4822 130 33524		
BZX55-B8V2	4822 130 33526		
5750	4822 157 51462		
5766	4822 157 51157		
5795	4822 157 52392		
5800	4822 157 50965		
3787	4822 111 30494	2,7 Ω	0,33 W
2788	4822 125 50045	20 pF	trimm.
2789	4822 124 21936	2.2 µF	50 V
Various			
1752	4822 242 70932	Crystal 6 MHz	
1788	4822 242 70932	Crystal 6 MHz	
1800	4822 242 71417	Crystal 13,875 MHz	
T8	4822 265 40471	8p	
T9	4822 265 40469	6p	

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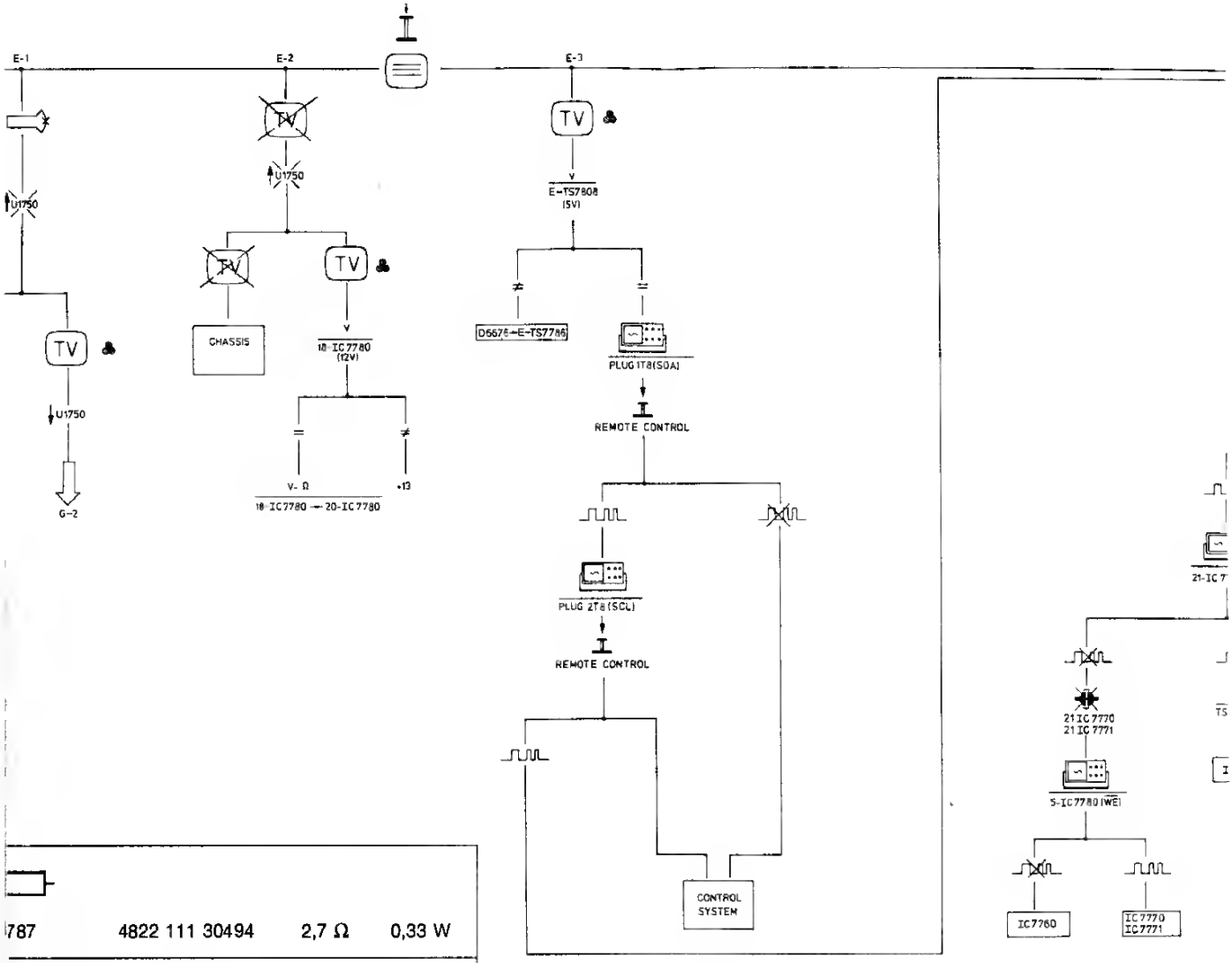

787	4822 111 30494	2,7 Ω	0,33 W

788	4822 125 50045	20 pF	trimm.
789	4822 124 21936	2.2 µF	50 V

arious

752	4822 242 70932	Crystal 6 MHz
788	4822 242 70932	Crystal 6 MHz
300	4822 242 71417	Crystal 13,875 MHz

3	4822 265 40471	8p
9	4822 265 40469	6p

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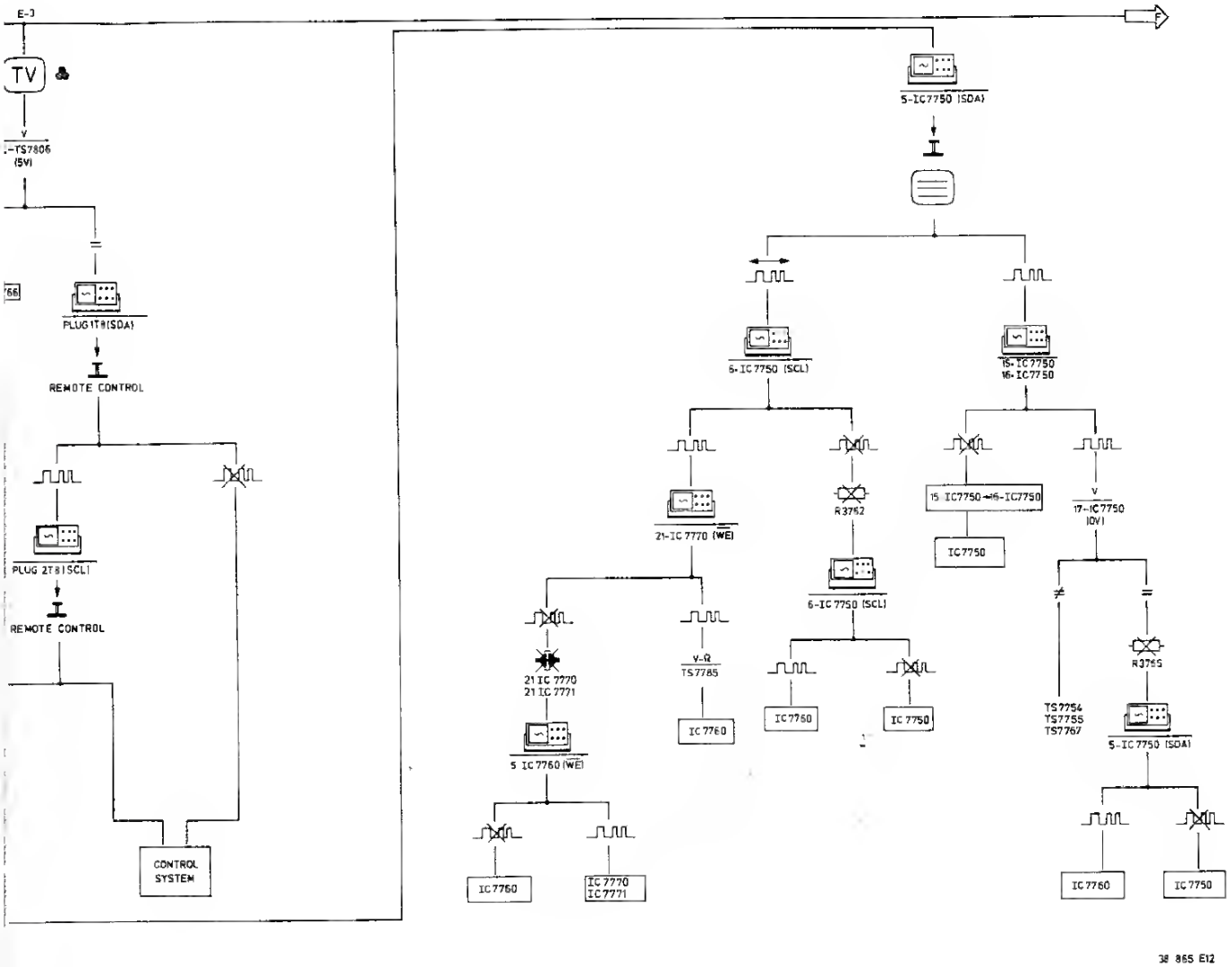

38 865 E12

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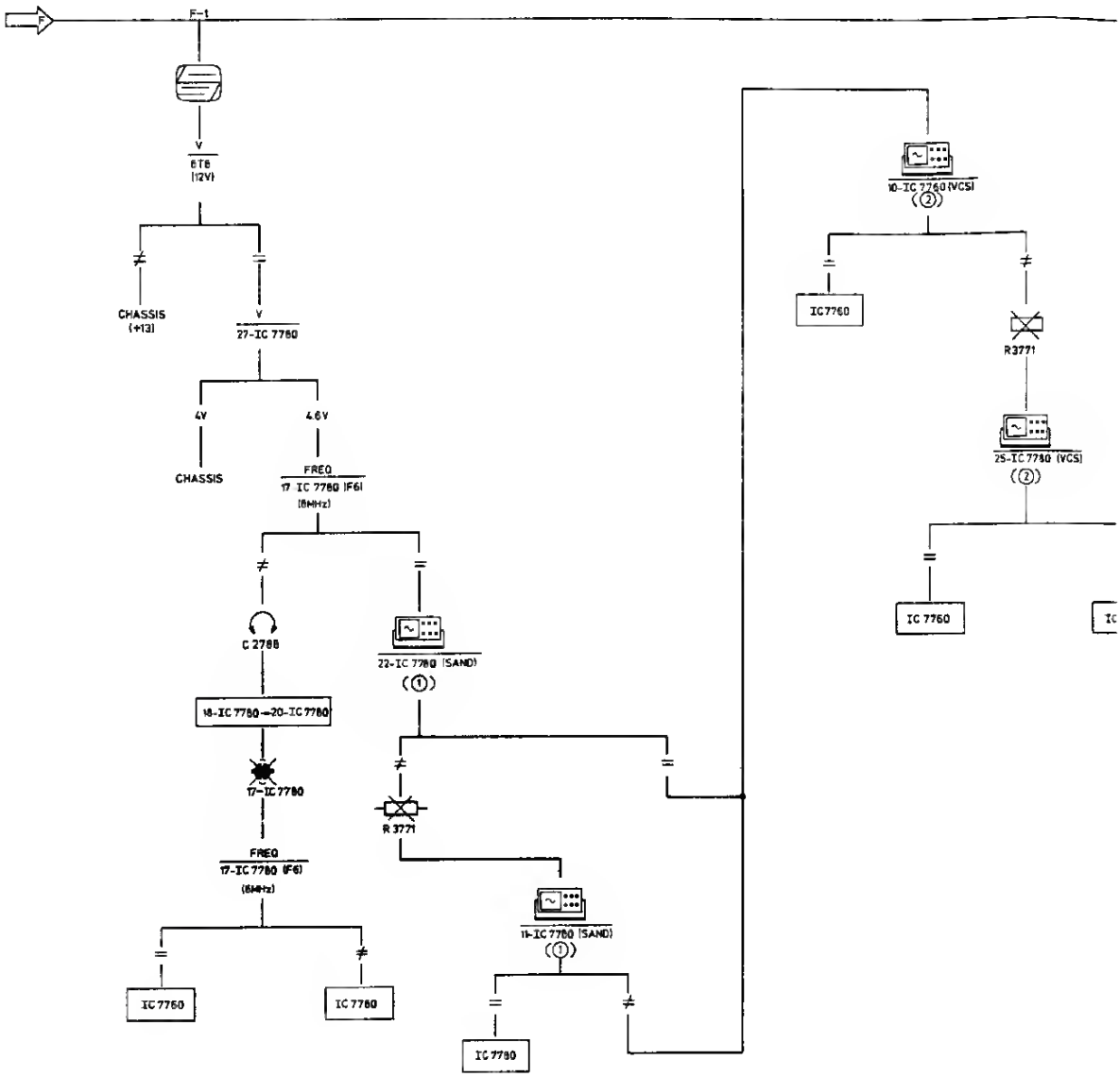
20.

REPAIR METHOD TELETEXT DECODER



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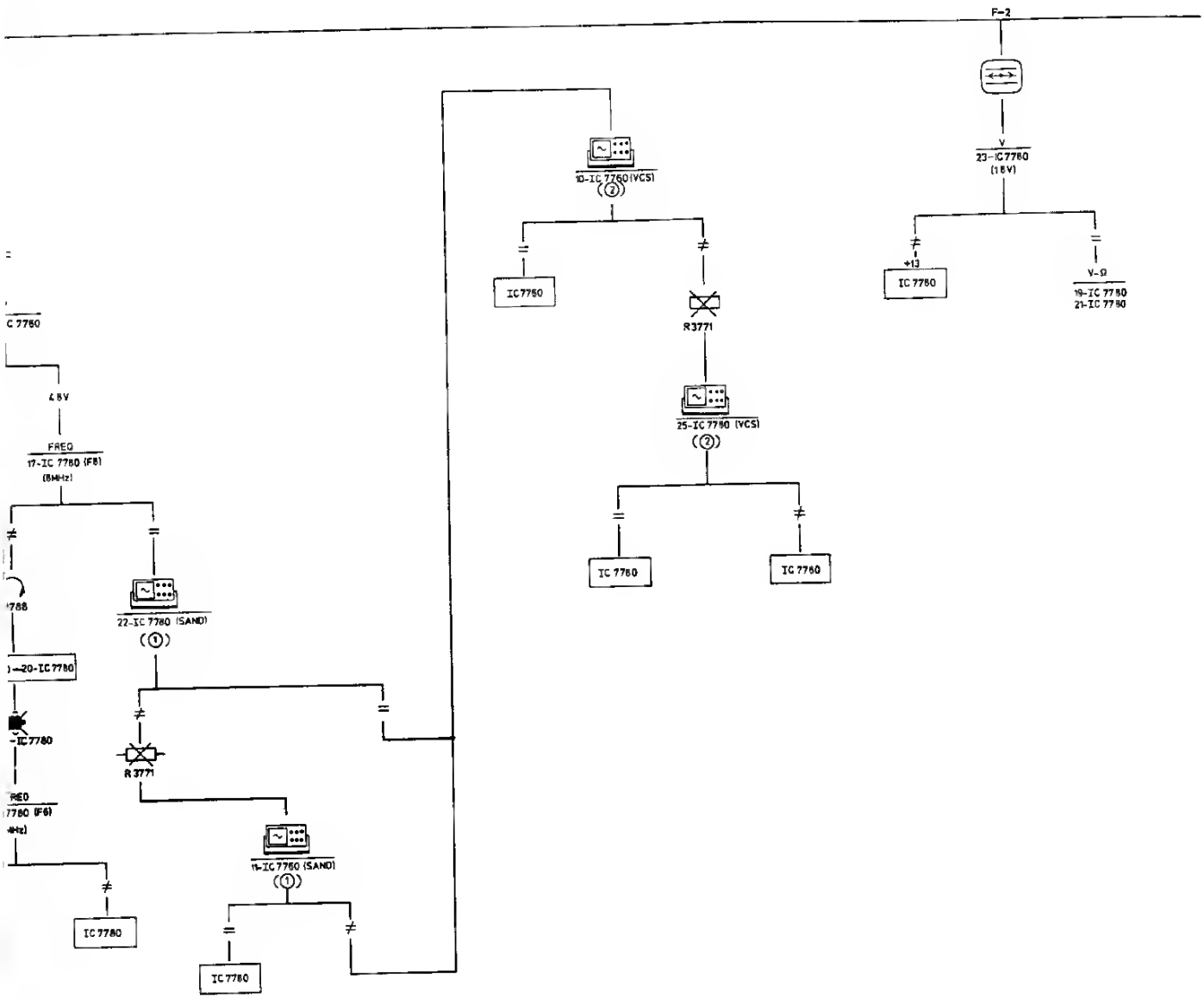

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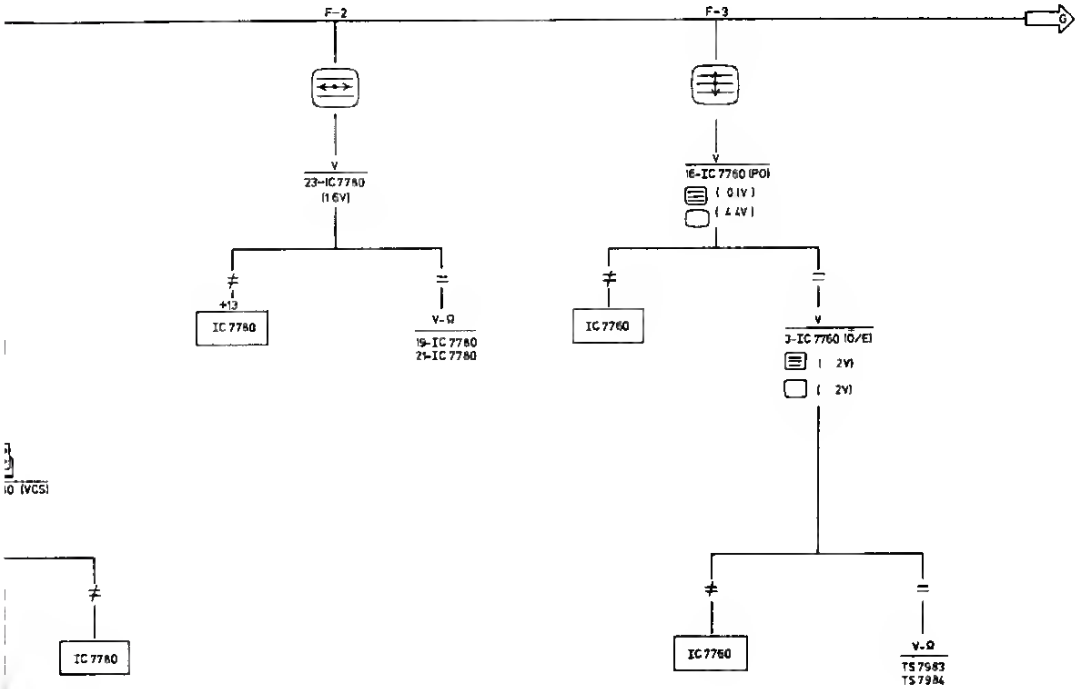

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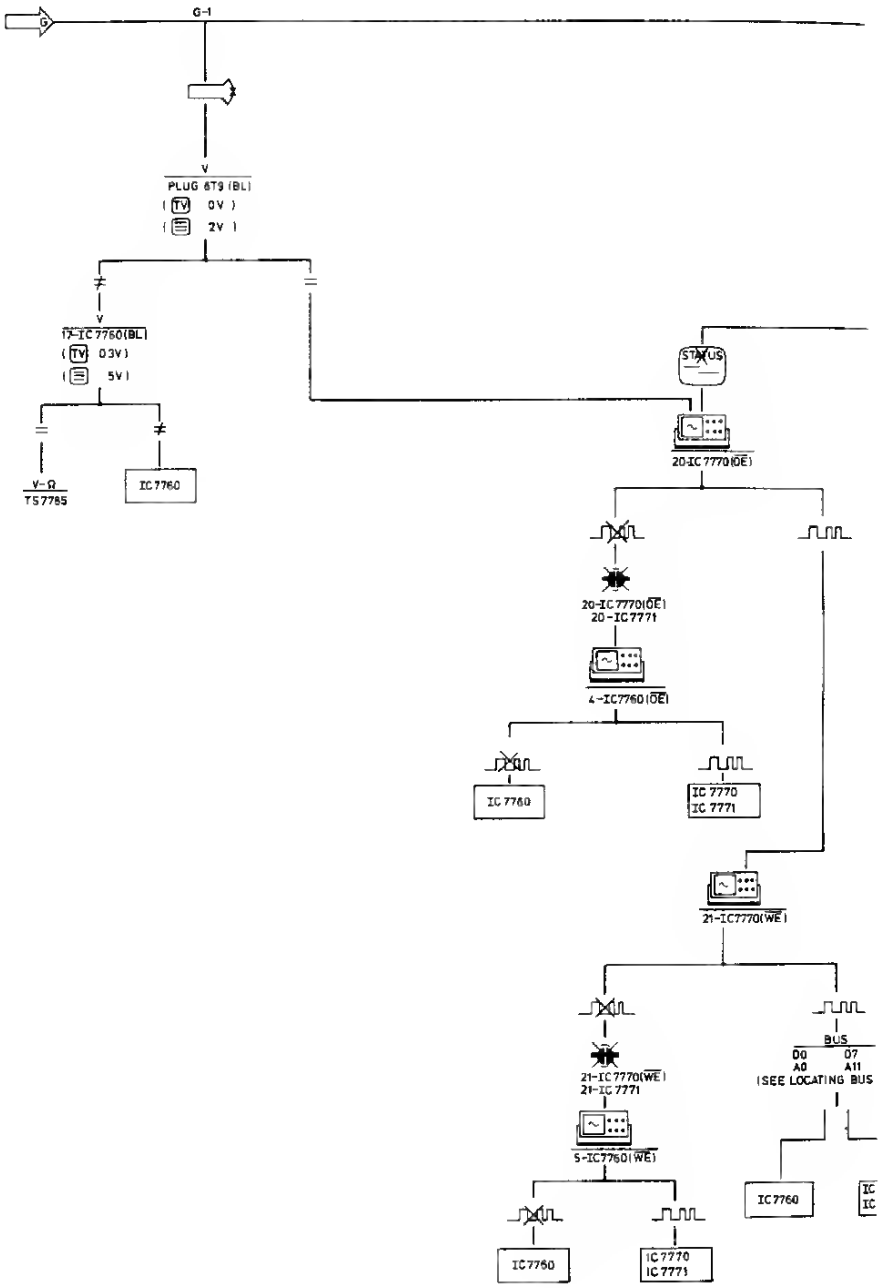

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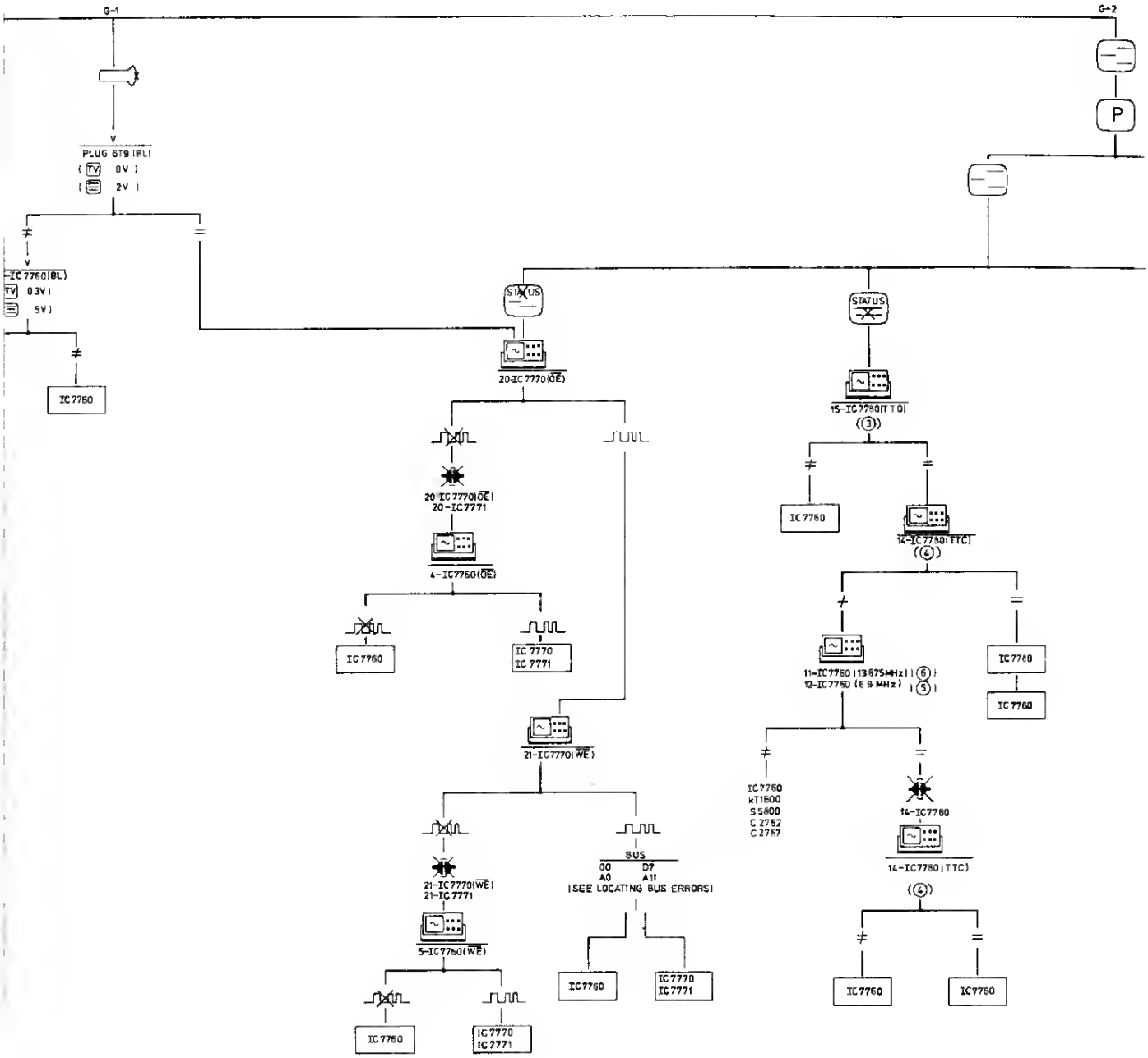

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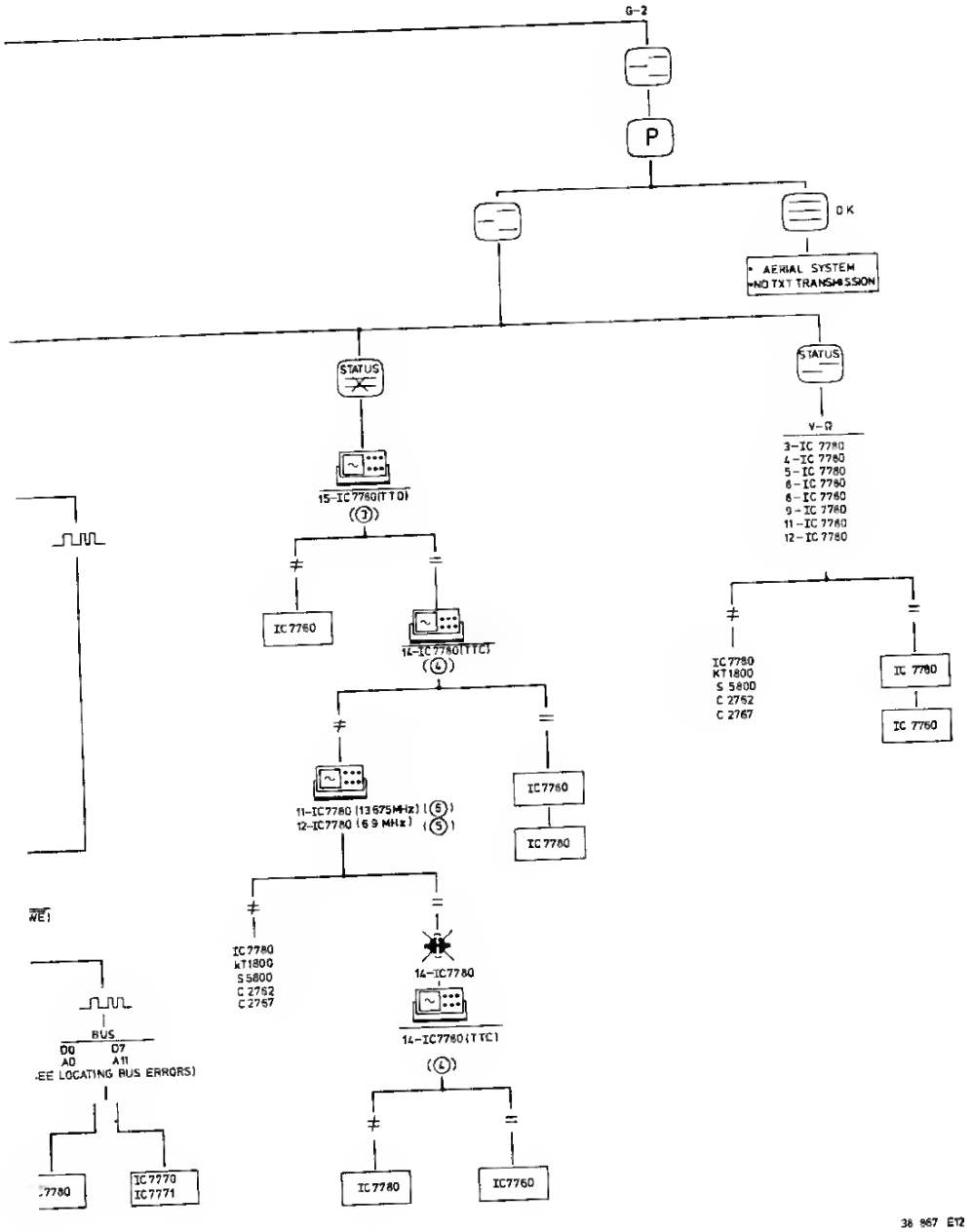

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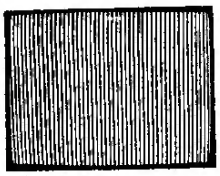
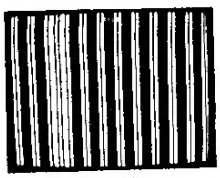
LOCATING BUS ERRORS IN THE TELETEXT DECODER

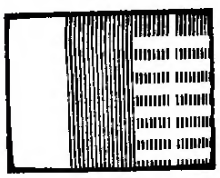
1. Loosen one side of resistor 3785 on the teletext decoder.
   Connect a piece of wire with measuring-pin to point 6 of socket T9.
2. Connect a TV pattern generator (i.e. PM5519) and tune the receiver normally.
   Apply a white pattern and select the teletext mode with the remote control.
3. When transferring the measuring-pin to the points of IC7760 which are indicated under the pictures below a defined pattern will be displayed on the screen.
   If the pattern is not present, but a uniform white or dark picture arises, there is question of short-circuit or an open connection on the relevant point. It may be caused by one of the three ICs, namely IC7760 - IC7770 - IC7771.



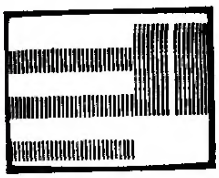
$\overline{OE}$ 4-IC7760



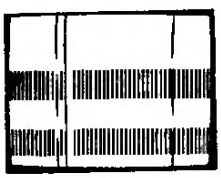
A1 31-IC7760



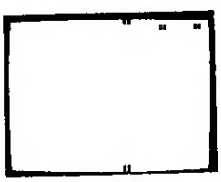
A4 34-IC7760



A7 37-IC7760

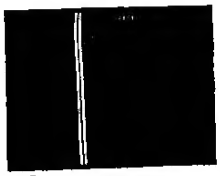


A10 40-IC7760

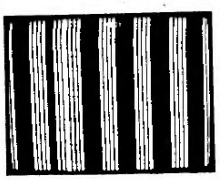


D2 24-IC7760

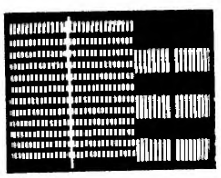
D5 27-IC7760



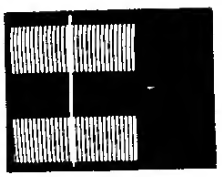
$\overline{WE}$ 5-IC7760



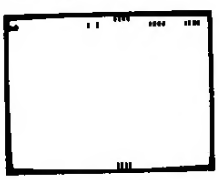
A2 32-IC7760



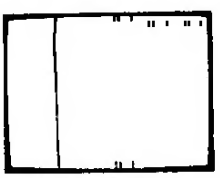
A5 35-IC7760



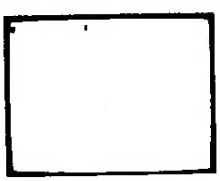
A8 38-IC7760



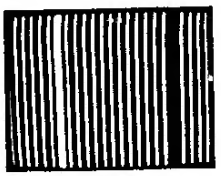
D0 22-IC7760



D3 25-IC7760



D6 28-IC7760



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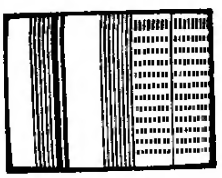
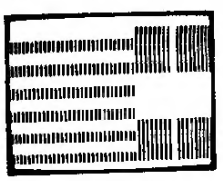
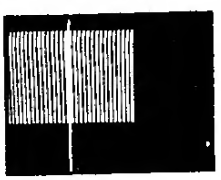


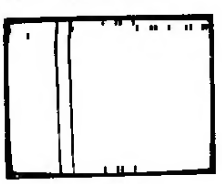
A3 33-IC7760



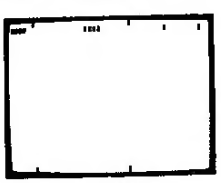
A6 36-IC7760



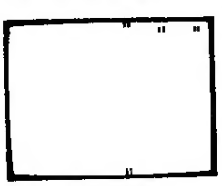
A9 39-IC7760



D1 23-IC7760



D4 26-IC7760



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22.

FAULTDIAGNOSIS CONTROL SYSTEM

Indication on programme display	Indication ⏻	Remark	Incorrect functioning	Correct functioning	Possible defective component
F0					IC7925-IC7926-IC7900
F1					U1840 U1830-IC7830-TS7856
F2		in TXT mode			TXT-decoder
F3					IC7900 +13 supply
F4					U1830-IC7830
88 O.K.			R.C. commands	Local key-board commands	U1840 U1830-TS7856-IC7830
88 O.K.					D6922-IC7900
NOT O.K.	LED flickers				U1830-IC7830
NOT O.K.					U1830-IC7830 +5 supply

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SYMBOLS FOR FAULT-FINDING TREES

M	Testpoint		Remove plug		No vertical deflection
	Supply aerial signal (colour)	A B	Connect the points A and B	TV	No vertical synchronisation
	Remove aerial signal	A B	Remove connection between points A and B	TV	No horizontal synchronisation
G	Connect generator (colour signal)		Adjustment (general)	TV	Horizontal centring incorrect
V	Carry out voltage measurements		Adjustment yields no result	TV	Vertical centring incorrect
Ω	Carry out resistance (Ohmic) measurements		Filament of picture tube glows		Vertical linearity incorrect
V-Ω	Check circuit of ... and ...		Filament of picture tube does not glow	TV	The left and right vertical lines are curved.
=	Correct		Normal light		Strong black/white noise
≠	Incorrect		Insufficient light		Weak or no noise
<	Lower than		No light		Colour blurrs in black/white picture
>	Higher than		Normal sound		Strong colour noise in black/white picture
	Check circuit between ... and ...		Weak sound	R B G	Correct sequence of colours
MAX	Set brightness control to maximum		No sound	500 A B	Insert 500 Ω resistor (25-50 W) between A and B
MIN	Set brightness control to minimum		Sound distorted		Too much light
MAX	Set contrast control to maximum		Normal loudspeaker noise		Line frame (Venetian blinds)
MIN	Set contrast to minimum		Weak or no loudspeaker noise		Colours
0 ⟷ 28V	Voltage adjustable by tuning	TV	Correct black/white picture		One or two colours weak or not present
	Remove unit		No or weak picture		Weak colours
u	Insert unit		Uniformly discoloured frame with no or weak picture		No colours
U	Replace unit	TV	Picture discoloured uniformly	1 2 3 SK2	Switch SK2 to position 2
V	Supply voltage "hiccups"	TV	Vertical amplitude too small or too large	SK1	Switch on receiver
	Insert plug	TV	Horizontal amplitude too small or too large	SK1	Switch off receiver

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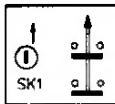
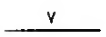
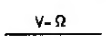
	Switch the set on		Remove resistor R ...
	No light		Remove bridging wire ...
	Unstable TV picture		Adjustment (general)
	TV-mode		Remove soldering bridge
	Teletext-mode		Apply soldering bridge
	Teletext rows are missing or include incorrect characters		Measure the voltage
	Statusrow is correct, other TXT-rows are missing		Check the circuit
	Statusrow is correct, other rows include errors		Measure the signal/oscillogram
	Stetusrow is not correct, other rows include errors		Measure frequency

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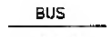
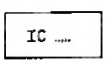
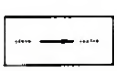
	Select other programm	=	No error
	Unsynchronized TXT-picture	≠	Error
	Teletext picture moves left/right		Pulse/pulse train present
	Teletext picture moves up/down		Pulse/pulse train not present
	Remove plug ...		Pulse/pulse train varies
	Insert plug ...		Check lines ... for bus errors
	Depress key ...		Correct television colour picture
	Replace IC ...		
	Check the circuit between ... and ...		

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